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The Late WALTER COFFIN, Esq.,
Pioneer of the Rhondda Valley Coal Trade.

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TRANSIT

OVER

ROADWAYS, WATERWAYS AND RAILWAYS,

IN ITS RELATION TO

THE COMMERCIAL DEVELOPMENT OF THE COUNTRY,

WITH A

SPECIAL REFERENCE TO THE COUNTY OF GLAMORGAN.

BY

W. E. WILLIAMS.

PRICE - - TWO SHILLINGS AND SIXPENCE.

Swansea:

SOUTH WALES DAILY POST, 211, HIGH STREET.

1907.

Trans.
Bradbr.
6-26-25

TO

MORGAN BRANSBY WILLIAMS, ESQUIRE,

MEMBER OF THE INSTITUTE OF CIVIL ENGINEERS;

JUSTICE OF THE PEACE;

DEPUTY LIEUTENANT FOR THE COUNTY OF GLAMORGAN.

SIR,

There are very few men to-day still actively engaged in the administration of Railways, and other Commercial undertakings, who can speak from personal recollection of the Trade of this District prior to its being served by Railways.

More than sixty years ago you were employed as a Mining Engineer at the Dinas Colliery, the property of your Uncle (the late Mr. Walter Coffin) which at that period, was the solitary one in the Rhondda Valley, you have, consequently, actually witnessed a development in the County of Glamorgan, that has been without a parallel in the history of Great Britain. I, therefore, venture to dedicate this work to you, since, from your own experience, you can confirm the accuracy of much that I have written.

I have the honour to be, Sir

Your obedient Servant,

W. E. WILLIAMS.

Swansea, August, 1907.

E.T.K. 11-12-45

PREFACE.

During the last few years, considerable time has been spent in discussing the Fiscal Policy of our Country, but it will, no doubt, be accepted by both Free Traders and Tariff Reformers, that what we shall have chiefly to rely upon in the future in order to maintain our position in the markets of the world, will be the adoption of the most improved methods for the production of the various articles of commerce, together with an efficient transit service.

Britishers from time immemorial have been considered a nation of grumblers, and in this respect the present generation may be said with truth to be following in their fore-fathers footsteps, and now that it has become a general practice to cry out that the Railways of the United Kingdom by their high rates and charges are crippling various trades, and so handicapping the development of our native industries in competition with those of other Countries, it is certainly interesting to make a review of the past, and compare the present day facilities of transport with those experienced by our ancestors.

Those who so readily criticise the policy and methods adopted for the working of our Railways, would do well to remember that their introduction, as measured by the great age of the world, is but a creation of yesterday, and it is only due to the pioneers of Railway enterprise to recognise the fact, that they have, in such a comparatively brief space of time, already done so much for our Country's welfare.

The introduction of Railways was entirely of British origin, and the inventors had no guidance from the experience of past generations, as the application of the motive power of steam was entirely modern, whereas in other industrial branches the so called inventions of to-day are in many instances but improvements upon ancient ideas.

In the following pages will be found particulars showing the slow progress made in the Nation's commerce before the advent of the iron roads, and also particulars of the wonderful and prodigious developments which have taken place since that time.

After a careful study of the various means of transit used in Great Britain since the Roman occupation, the outstanding place occupied by our Railway systems, and the record of prosperity so largely due to their extension justifies the belief that if Railway Companies are but given reasonable encouragement they will continue to co-operate in any extension of business that they may be called upon to provide for.

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TRANSIT BY ROADS.

With the march of civilisation, and as man became more ready to follow peaceful pursuits, began the making of roads, but although it is the general rule of historians to make eulogistic references to the roadways constructed in Britain by the Romans, they were far inferior to what they constructed in their own Country, and in other parts of the Continent of Europe; they were, however, superior to the roads made by the inhabitants of Great Britain themselves for several centuries after their departure. The Roman roads were usually made in a straight line, and little or no effort was taken to improve the natural gradients, due doubtless to the fact that vehicular means of transport had not at that time come into general use.

The first toll for the repairing of highways was imposed in the year 1346, and was allocated for the purpose of mending the road between St. Giles and Temple Bar, London. It was not, however, until the reign of Queen Mary, 1553-1558, when the first general law appointing that their repair should devolve upon the respective parishes throughout England, that any systematic steps were taken for the maintenance and improvements of our highways, and long after this, the existing roads, even in the neighbourhood of London, were in a deplorable condition, many of them being quite impassable during the winter or in wet weather, and the only advantage gained in following them at other times was that they were generally on higher ground than the adjoining lands, and the pedestrians were thus able to keep clear of morasses. The majority of these roads at best were but mere bridle paths and of no service for vehicular traffic. With such inadequate means of transit, it is not surprising that the

trade of the Country was of very little importance, being principally confined to London, and a few other places on the sea coast. An idea of its extent may be gathered from the fact that at the end of the 14th century, the total value of our imports and exports for one year only amounted to £333,155.

The methodical improvement of the highways during the reign of Queen Mary, and continued during the following reign, gave a considerable impetus to trade, and the commercial era of Great Britain may be said to date from about the year 1580. It was in this year that English ships first commenced to sail to the Baltic and Mediterranean Ports. At this period, however, we were a long way behind other Continental Nations, as is proved by the fact that there were then trading to Holland only sixty English ships, whereas the Dutch were trading to England with six hundred of their vessels. In the year 1582, there were 1,232 English ships, but out of this number 1,115 of them were of less than eighty tons burthen. In the year 1609, the East India Company built a vessel of 1,200 tons burthen, which tonnage was a long way in excess of any other ship afloat, and at that time created far more astonishment than was witnessed last year at the launch of the "Lusitania," a steamer of 32,500 tons.

The peace which was maintained during the reign of James I. was favourable to industry and commerce, which, together with the extension and improvements made in the highways, thus enabling wheeled vehicles to be more generally used, led to a great expansion in the trade of the Country, which in the last year of his reign (1625) amounted to £4,939,751, the imports being £2,619,315, and the exports £2,320,436.

Prior to the year 1662, when the first Act was passed authorising the erection of "Turnpike Gates," the maintenance of the roads devolved upon each parish in which they were situated, and under the Act of 1555 the Surveyors of the respective parishes had to keep them in repair by the employment of forced labour. The first "Turnpikes" were

erected at Wadesmill, Caxton and Stilton about 1663, and their great extension took place in the reign of George II., 1727-1760. During the reign of this monarch Acts were passed prescribing the width of the wheels attached to heavy carriages in order that the roads might be better preserved, and also for rendering more effectual the laws then in existence for the maintenance and improvement of the highways throughout the Kingdom. The years of this reign are described by historians to be "the most prosperous season that England had experienced," and striking testimony of the important part which facilities for road transit performed in the development of the Country is to be found, in the fact that our trade in the year 1763 amounted to £23,456,000. This year's figures are given because it was in that year that the first Canal was completed, and up to that date inland communication was entirely dependent upon road transport, with the exception of a few instances where rivers had been made navigable. In the first fourteen sessions of George III., 1760-1774, no less than 452 Acts were passed for extending and repairing the roads in different districts, the money being raised by way of loans from the general public, and the management of same was vested in Trustees, who paid the interest upon the loans by means of the tolls collected, the general scale of rates levied for using the roads being as under :—

Road toll for every horse drawing a waggon or carriage	6d.
Road toll for every horse laden or unladen ...	2d.
Bridge toll for every horse drawing a waggon or carriage	6d.
Bridge toll for every horse laden or unladen ...	2d.
Bridge toll for every person on foot or riding...	1d.

These tolls were levied in each district, and on each journey made. The toll for the use of the bridges was also protected by a clause in the various Acts, which imposed a penalty of £5 upon any person using a boat or barge for

ferrying a river within three-quarters of a mile of a bridge, and any person fording a river within three miles of a bridge was liable to a penalty of twenty shillings.

Although the roads were of such great assistance to the Country generally, their extension was strongly opposed in many districts, and as recently as the middle of the 18th century the inhabitants in the Counties in the neighbourhood of London petitioned Parliament against the extension of the Turnpike roads into the remoter Counties, because it was feared that the people of these outlying districts, from the cheapness of labour, would be able to sell their hay and corn at a lower price in the London markets than themselves, and thus ruin them by competition.

The utility and assistance derived by the community through the construction of roads has been fully recognised, but evidence that this method of transit was quite inadequate for dealing with the requirements of the people, without taking into consideration the necessity for the development of the resources of the Country owing to the growth in population, is to be found in the fact that there was at that time the greatest possible inequality in the distribution of produce, and a necessarily corresponding variety in prices. The inhabitants of London were often suffering and in actual want of food, whereas in other parts of the Country there was an over production, which, from want of transport facilities, naturally went to waste.

The roads constructed in the early days were quite different from the smooth and level roads of to-day. Little or no improvement had taken place in the methods of their construction from the time of the Romans up to the commencement of the 19th century, when Telford and Macadam made great progress in this direction. An idea of the discomfort in travelling then may be gathered from a letter written by Sydney Smith, describing a journey taken by himself at the end of the 18th century, he says :—" It took me " nine hours to go from Taunton to Bath, a distance of 40

"miles, and I suffered from ten thousand to twelve thousand "severe contusions."

Coaches were first used in the year 1555. Owing chiefly to their cumbrous construction and to the nature of the roads, six horses were required to draw one of these clumsy vehicles at a walking pace for any considerable distance. In 1650, the stage coaches occupied a week in travelling from London to York, and from London to Oxford it took two days for the distance of 55½ miles. In 1784, considerable improvement was effected by the introduction of mail coaches, and the journey by this means from London to Bristol occupied fifteen hours, the reverse journey occupying 16 hours, being an average of seven miles an hour. It took Lord Eldon four days to perform a journey from Newcastle to London in a fly. Between Edinburgh and London there ran one coach a month, taking from twelve to fourteen days to perform the journey. From London to Liverpool, what was described as a flying machine started three times a week, and it performed the journey in forty-eight hours. It was a day's journey by coach from Liverpool to Manchester, a distance of about thirty miles. Many other instances could be given, but the following extract from the *Cambrian* newspaper, dated 19th December, 1806, will give a very good idea of the difficulties of transit one hundred years ago :—"We are con-"cerned to find that some of our friends were disappointed "in the receipt of last week's paper. An accident having "happened to the mail coach on Friday, the letters from the "westward were conveyed hither in a chaise, and the bags "containing our papers were forwarded that evening in the "same way. But the incessant rains having rendered the "roads so heavy that the chaise could not proceed, the guard "went on with the mail on horse-back. Upon the bags being "opened at the Bristol Post Office, some of our papers had "lost their directions by the friction, and could not therefore "be forwarded to their destinations. As no censure attaches

"anywhere, we hope those of our readers, who were deprived "of their papers, will not impute any blame to us."

Many of the roads were still at this date quite unfit to travel upon, although in the year 1789 a number of gentlemen had called a meeting in Swansea to discuss the condition of the main roads from the river Severn to Hubberstone in Pembrokeshire, which resulted in the formation of the "South Wales Association for the Improvement of Roads," and the Committee appointed by this Association subsequently reported that the state of the roads in some places was so extremely bad that they were not passable without considerable difficulty and danger, never having been repaired within the memory of man. The improvements effected by "Macadam" added much to the comfort of travelling, and before the coaches gave up competing with railways they were able to maintain a speed of ten miles an hour, and the following very creditable regular services had been established :—

London to Shrewsbury	...	154	miles in	15	hours.
" " Exeter	...	171	" "	17	"
" " Manchester	...	187	" "	19	"
" " Holyhead	...	261	" "	27	"

The fares for passengers per coach between Liverpool and Manchester were ten shillings inside and five shillings outside, and from London to Liverpool £10 inside and £5 outside.

The cost of conveyance of goods by road between Liverpool and Manchester was £2 per ton ; between Liverpool and Birmingham, £5 per ton ; between Chester and Wolverhampton, £3 10s. per ton ; and the rate charged from London to Leeds was no less than £13 per ton.

The rates for the inland postage of letters were fixed in 1784 on the following basis :—

From any Post Office to any place not exceeding 15 miles from any such Post Office	...	4d.
Above 15 miles and under 20 miles ...	...	5d.

The Coaching Days of Old England.

Above	80	miles	and	under	120	miles	...	... 9d.
"	120	"	"		230	"	...	... 11d.
"	230	"	"		300	"	...	... 12d.

For every additional 100 miles one penny.

This scale applied to letters for each quarter of an ounce, so that a four ounce letter, which to-day costs one penny, would in those days have cost sixteen shillings for any distance between 230 and 300 miles.

Several attempts were made in the early part of last century to introduce mechanical contrivances for the conveyance of passengers over our highways, and in 1802 Trevethick invented and patented a steam carriage, which was brought from his workshop near Lands End in Cornwall to London for exhibition purposes. It ran to Plymouth over the road, on its own wheels, and from there it was conveyed by sea to its destination; the inventor did not, however, succeed with this enterprise sufficiently to encourage him to continue experimenting with it, and he thereupon turned his attention to the construction of tramway locomotives. No further progress in this direction appears to have taken place until Mr. Gurney in 1827 built his steam carriage, which was tested on the 18th December of that year, and the trial trip is thus described by an eye witness:—"About three o'clock the carriage was launched from the tressels, the man who was guiding it being seated rather lower than where the coachman sits in a common stage coach. He held a handle like a pole of a Sedan chair in his hand, and on his right was a semicircular plate of steel with a handle moving it also wherewith to regulate the steam, by which means he can turn it off or on at pleasure; thus equipped the whole machine was under the guidance of this single man. The carriage went out of the factory most majestically, and proceeded about three or four hundred yards when it was turned with the greatest facility, though a sharp corner, under an archway into the exercising ground belonging to the horse barracks, which it went round in every direction most beautifully. It went very

easily with scarcely any noise, it was stopped with the greatest facility, and was guided nearly as readily as a Sedan chair. It emitted little or no smoke from the chimnies, the fuel being only a mixture of coke and charcoal."

It does not appear whether or not this correspondent was an interested party in the invention, but in any case, the statement that the engine made scarcely any noise must be accepted *cum grano salis*, because reliable writers referring to somewhat later road steam carriages describe the noise from them, when in motion, as resembling an engineering works in full swing.

It was claimed for Mr. Gurney's carriage, that it could conveniently carry six inside, and fifteen outside passengers, and that a child of five years of age had driven it through difficult passes, without deviating an inch from the proper course. The total weight of the carriage was one-and-a-half ton, and its wear and tear of the roads, as compared with carriages drawn by four horses, was as one to six the mischief done by the feet of the four horses to the surface of the roads. The engine was of twelve horse power. Mr. Macadam suggested that by broadening the wheels of this carriage more good than harm would be done to his roads.

The first long distance journey with this carriage was made to Windsor on the 26th December, 1827, and was considered so successful that by 1831 several similar coaches were plying regularly on certain roads near London, and a scheme was prepared for establishing a service with these vehicles between London and Holyhead, when the Trustees of the Turnpike roads became alarmed from some reason or other, or perhaps without any reason whatever, and imposed prohibitory tolls upon steam carriages. The promoters then sought the aid of Parliament, and a select Committee was appointed to enquire into the whole question, and they subsequently reported as follows :—

1. Carriages can be propelled by steam on roads at an average rate of ten miles an hour.

Rail Car, 1830.

Road Steam Carriage, 1830.

UNIV. OF MICH.

2. That at this rate they have conveyed upwards of fourteen passengers.
3. That their weight, including engine, fuel, water and attendants may be under three tons.
4. That they can ascend and descend hills of considerable inclination with facility and safety.
5. That they are perfectly safe for passengers.
6. That they are not nuisances to the public.
7. That they will become a speedier and cheaper mode of conveyance than carriages drawn by horses.
8. That they will cause less wear and tear of roads than coaches drawn by horses.
9. That rates of toll have been imposed, which would prohibit their being used on several lines of route, were such charges permitted to remain unaltered.

The result of the Committee's Report was—that a Bill was brought in, in 1832, to relieve steam carriages from excessive rates of toll, which measure was carried through the House of Commons, but it was thrown out in the House of Lords, and the enterprise, so far as the proposed service between London and Holyhead was concerned, in which a large capital had been invested, collapsed. For a few years after this several further notable attempts were made to introduce steam coaches over our roads, but owing to the strong opposition of the stage coach proprietors, coupled with the fact that their construction was not nearly so satisfactory as the engines devised for running on railways, none of the ventures were successful, and the idea of using our roads for the conveyance of passengers over them in vehicles driven by mechanical power was allowed to remain dormant for more than half a century.

As a matter of fact, up to the passing of the Locomotives on Highways Act of 1896, every vehicle mechanically propelled had to be preceded by a man carrying a red flag, and the speed was limited to four miles an hour, in addition to

which there were several other restrictions as to where and how they should run.

It is difficult to realise at this date when we can now witness beautifully equipped motor vehicles of all descriptions and sizes gliding rapidly over our roadways, the passionate opposition that the pioneers of improvements in means of communication had to contend with. Not only were the engineers when out surveying in danger of their lives at the hands of the ignorant and uneducated populace, for whom there is some excuse, but in the Houses of Parliament they were scornfully pointed out as being ludicrously incompetent if not mentally insane. Then, again, the Press of the day heaped all kinds of abuse and ridicule upon their schemes, and at the end of this book will be found in the Appendix a copy of a letter written in 1827, which will convey a very good idea to the reader of the insulting and sarcastic tone, in which some of the smart writers of the day were only too ready to indulge.

There are, of course, many amusing anecdotes on record respecting the early days of steam locomotion, one of the best of which relates to Trevethick, whose engine, when travelling over the road on its first journey to Plymouth, got unmanageable when descending a hill, at the foot of which there was a toll-house. It was making a terrible noise as it came along at a rapid pace, and the driver's face was black with smoke, the poor toll-keeper at once jumped to the conclusion that the evil one was paying a visit to earth from the lower regions, on a machine of his own invention, and it is needless to add that the toll-keeper made no attempt to collect any toll, being immensely relieved when the wonderful sight of such a contrivance disappeared from his view.

TRANSIT BY CANALS.

The middle of the 18th century has been aptly designated, as the seed time of British commercial prosperity, which has since become the envy of the whole civilized world. It was at this period that the valuable properties of steam as a motive power were properly understood, followed by great progress in those scientific and mechanical inventions, which have revolutionized British industries. It is fortunate, therefore, that contemporaneously with these discoveries, England, by the making of Canals, and the extension of her internal means of communication was enabled to cope with the increased productive power of her people.

We have already noted the opposition to the extension of the turnpikes by the Londoners, the promoters of Canals likewise in their turn had to contend with great opposition to their schemes from the Turnpike Trustees, who realized that the competition of the Canals would deprive them of some portion of the tolls that they had hitherto received. For similar reasons also the owners of pack horses and road vehicles joined them in opposition. The landowners and farmers argued that the Canals would injure their land, that they would tend to reduce the breeding of horses, which would result in less land being cultivated for the production of hay and corn, it was further argued that Canal Navigation would injure the coasting trade and weaken the navy. The answer made to some of the criticisms was that the development of Canals, and consequent increase of business, would lead to considerably more labour being required than would be displaced by any reduction of road transport, which was fully borne out by the results. The reply of the promoters as

to the breeding of horses as given below, was not however in accordance with the facts, their argument was : "The great advantage that this kingdom will derive from a less number of horses being kept for draught purposes is prodigious, as the same lands that keep 20,000 horses will now keep 30,000 fat oxen, by which means butchers meat will be always cheap to the labouring poor, and the quantity of fat from so many beasts, will, of course, make candles cheap, and so many hides lower the price of leather, and if so, of shoes and other things made of leather."

Notwithstanding the great opposition the promoters of Canals had to encounter, 3,277 miles of Canals were opened up in Great Britain between the years 1760 and 1834, in which latter year the making of Inland Canals, as distinct from Ship Canals ceased.

The first of the modern Canals was built by Brindley, on behalf of the Duke of Bridgwater, between Manchester and Liverpool, and was opened for traffic in 1763. This Canal enabled the Duke to convey coal from his Worsley Collieries to Liverpool and Manchester. Before the opening of this Canal the cost by the Irwell River Navigation, which had been opened since 1720, was twelve shillings per ton between Liverpool and Manchester, and the canal reduced the cost by about one-half.

The capital expended by the Duke was repaid to him many times over, and the success of this undertaking quickly led to the extension of Canals in various other districts, where they were equally as successful, as may be judged from the fact that in many instances shares in these concerns were bought and sold at ten times their nominal value. This led to the Canal boom of 1790, when a very large number of Schemes were submitted to Parliament for their further extension.

The proprietors of Canals did not as a general rule provide the barges for the conveyance of merchandize themselves, neither did they perform the towage services, these

being provided by the traders, but were simply takers of toll for the use of the Canals in the same way as the Turnpike Trustees. The tolls levied were fixed by Statute, and the Acts authorizing their construction usually contained the following clauses :—

1. The Canal and towing paths must not exceed 28 yards in width, except at crossing places where the breadth must not be more than sixty yards.
2. The following tolls were authorized to be taken :—

Iron Ore, Coal, Charcoal, and Limestone	2d.	per ton,	per mile.
Pig Iron	2½d.	"	"
Iron Castings	3d.	"	"
Iron Goods, Wares and Merchandise	4d.	"	"

3. The proprietors could reduce or advance their rates from time to time, but could not advance them in excess of the statutory figures.
4. They had power for making Railways to the Canal from places within a radius of eight miles.
5. Provision was made that the owners should only be taxed for parochial purposes in the same proportion as other lands or grounds adjoining were rated.
6. A further provision was made that the Company should not be rated in respect of the rates of tonnage received by them.

In 1790 a Mr. Phillips, who took a very active interest in the promotion of Canals, wrote :—"They had assisted the resources of the Country in a greater degree than any other enterprises, they had been the means of enlarging both our foreign commerce and our internal trade, and their introduction had been such as to entirely change the appearance of the districts through which they passed." As the benefits to be derived from this means of transit became appreciated, the construction of Canals in various localities aroused considerable enthusiasm, and when completed their opening was

celebrated by the ringing of the church bells and the regaling of the workmen with strong beer.

In 1790 the trade of Great Britain was £34,026,000, or £10,570,000 in excess of the figures for 1763, which have already been given, and in 1824, which is the year preceding the opening of the first public railway in this Country, the trade had risen to £86,096,000.

In 1750 the entire output of pig iron from the whole of England and Wales was only 17,350 tons per annum, which increased to 68,000 tons in the year 1788. The total output of coal from the whole Kingdom was estimated in the year 1770 to be 6,205,000 tons. In the year 1824 the output of pig iron approximated to a 1,000,000 tons per annum, and the output of coal was about 20,000,000 tons per annum.

There had been many factors at work in bringing about this great increase of trade, but the chief place must be given to the improved means of transit by the Canal navigations, as without such facilities it would have been quite impossible for any such development to have taken place, because in addition to the fact that transport by road was too costly, and generally unsatisfactory, there were not sufficient beasts of burden to deal with the traffic. Traders had in many districts to depend upon pack horses and mules for the conveyance of their articles of commerce from one place to another. The average cost by this means was about half-a-crown for as much as the animal could carry.

In 1790 the Canals had reduced the rates as compared with the figures previously charged for the conveyance by road as under :—

Manchester and Liverpool from £2 per ton to 8s.

Manchester and Etruria from £4 per ton to 15s.

Manchester and Bromley Common from £4 per ton to £1.

Manchester and Wolverhampton from £4 13s. 4d. per ton to £1 5s.

Liverpool and Birmingham from £5 per ton to £1 10s.

Paddington Canal, 1820.

Paddington Canal, 1840.

Chester and Wolverhampton from £4 10s. per ton to £1 15s.

In the face of the great saving effected, it is not surprising to find a Committee of the House of Commons reporting in 1830 that:—"The effect of opening means of inland navigation, when formed upon scientific principles, and executed with due economy has been on the concurrence of all testimony, the extension of improved agriculture, the equalization of the prices of fuel and provisions in different districts, the diminishing of the danger of scarcity in both of these necessaries of life, and advancing the general improvement of the condition of the people by the creation of a new, vigorous, and continued demand for labour."

The greatest drawback to Canal Transit was the slow rate of speed attained, which only averaged a little over three miles an hour. The journey by this means from Liverpool to Manchester occupied twenty hours, whereas the distance by coach was traversed in one-fifth of this time. Canals were not therefore of much use to the travelling public, when a question of time was of any importance, as the following extract from the *Times* of December 19th, 1806, will show:—"The first "division of the troops that were to proceed by the "Paddington Canal for Liverpool, and from there by trans-"ports for Dublin, will leave Paddington to-day. By this "method of conveyance the men will be *only* seven days in "reaching Liverpool and with little fatigue. Relays of horses "have been specially ordered to be in readiness."

It may be of interest to here mention that the London and North Western Railway Company are to-day running their trains regularly between London and Liverpool in 3 hours, 35 minutes.

In addition to the time occupied in transit during normal times, Canals suffered from the further disadvantages of being short of water in summer, which considerably impeded their navigation, and in the winter, they were frequently frozen over and completely closed for weeks together. The news-

papers of the period contain many interesting and amusing accounts of the skating which was indulged in over the Canals at that time.

Now that so many of the once prosperous and useful Canals have fallen into decay in this country, it is curious to notice the attempts made by interested individuals to compare them with the prosperity of the Canals in Foreign Countries, and the unfairness of such a comparison, is strikingly shown by Mr. Pratt, who has written extensively on this question, where he points out, that whereas in Great Britain there is one lock for every 1¼ miles of navigation, between Hamburg and Berlin, in a waterway of 230 miles, there are only two locks for the throughout distance.

The Canals in this Country have admittedly suffered from the superior advantages of Railway transit, and in recent years the transition in the methods of doing business has been such as to render them quite useless in competition with Railways where there is any urgency required in the delivery of goods. No doubt by re-opening some of the Canals, which have fallen into disuse, they would be able to deal with some small proportion of the traffic now being dealt with by Railway Companies, but by far the greater portion of our inland trade would still, of necessity, have to be carried by rail, and as will be shown in succeeding pages of this work their resuscitation would not open up any new fields of industry, neither would they be of any benefit to the community at large. The cost of their re-construction would be heavy, and in many cases would exceed the original outlay, so that in view of all the circumstances a project having in view the revival of Canals could not possibly be a financial success, especially when it is remembered that since the inauguration of Canals, Railways have been the means of giving birth to many industries which entirely depend upon rapid means of transit for their existence.

As already shown Canals have rendered the Country signal services, but where the altered conditions of trade

have led to their becoming obsolete, the Nation may safely leave to other methods of transit what is required for transportation.

In their palmy days the Canals made greater profits than any other concerns, either before or since. That they did not succeed in giving satisfaction to the trading community is, however, to be seen in the reports of the various Chambers of Commerce, who adversely criticised their administration. We notice likewise how quickly manufacturers of the day took advantage of the introduction of Railways, and diverted their traffic to this means of conveyance.

TRANSIT BY RAILWAYS.

When considering the influences which have led to the present day unexampled prosperity of Great Britain, it will be readily admitted that much is due to the natural advantages it possesses in a practically inexhaustible supply of coal and other minerals, together with its insular position, which has enabled our ships to become the ocean carriers of the world.

Without in any way under-estimating the value of these advantages, it should not be forgotten that iron was manufactured, and coal taken from the bowels of the earth, in the time of the Ancient Britons, but very little development of the resources of the Country took place for centuries. We were merely imitators of other Countries in the construction of Canals, but in the invention of steam power, both for manufacturing purposes and Railway traction, we were first among the nations of the world.

The origin of Railways may be traced from the tramways, which were, in the first place, made of wood or stone. In the year 1777, a cast iron tramway was constructed in the neighbourhood of Sheffield, which was however destroyed by the workmen in the district, who were afraid that it would have the effect of reducing their employment, and a determined attempt was made upon the life of the inventor. These tram-roads or rail-roads became gradually adopted to a great extent in connection with various collieries, and by the year 1811, there were no less than 150 miles of railway in South Wales and Monmouthshire. As an instance of the useful purpose served by these old tram-roads, we may refer to that serving the Penrhyn Slate Works, which was commenced in 1800, and finished in 1801. It was six-miles-and-

To the Mumbles, 1840.

To the Mumbles, 1907.

a-quarter in length, and ten horses, by the use of this railway, drew as much as four hundred horses had been accustomed to draw on the common roads. The old tramways were very little used except for the conveyance of merchandise, passengers were, however, conveyed over the Swansea and Mumbles Tramway, the Act for which was obtained as early as 1804, and also in 1805 between Wandsworth and Croydon over the Surrey Iron Railway, the haulage services being performed by horses in both instances.

In the early days of Railways the respective Companies adopted different gauges in constructing their tracks, varying from 4 feet to 7 feet. The most generally adopted being 4 feet 8½ inches, probably from no other reason than that it was the standard gauge of the existing tramways, and although a Parliamentary Commission was appointed in 1845, which resulted in an Act being passed in 1846, stipulating that in future Railways intended for the conveyance of passengers should be laid to a gauge of 4 feet 8½ inches, there are many engineers of to-day in this Country who still believe that better results would have been attained by the acceptation of a wider standard. Whether this be so or not, it is true that on the broad gauge line of the Great Western Railway, the first portion of which was opened for traffic on June 4th, 1838, that that Company's engines were able to outstrip other competitors, in the rate of speed, and as early as 1845, they ran a train from London to Exeter, a distance of 192 miles, in 4½ hours.

The strongest possible opposition was given in Parliament to the various Bills deposited for the construction of Railways by the Owners of Canals and the Turnpike Trustees, and the latter were successful in obtaining from the Government a grant of £130,000 for the purposes of making the main road from London to Birmingham "so perfect as to compete with any Railway."

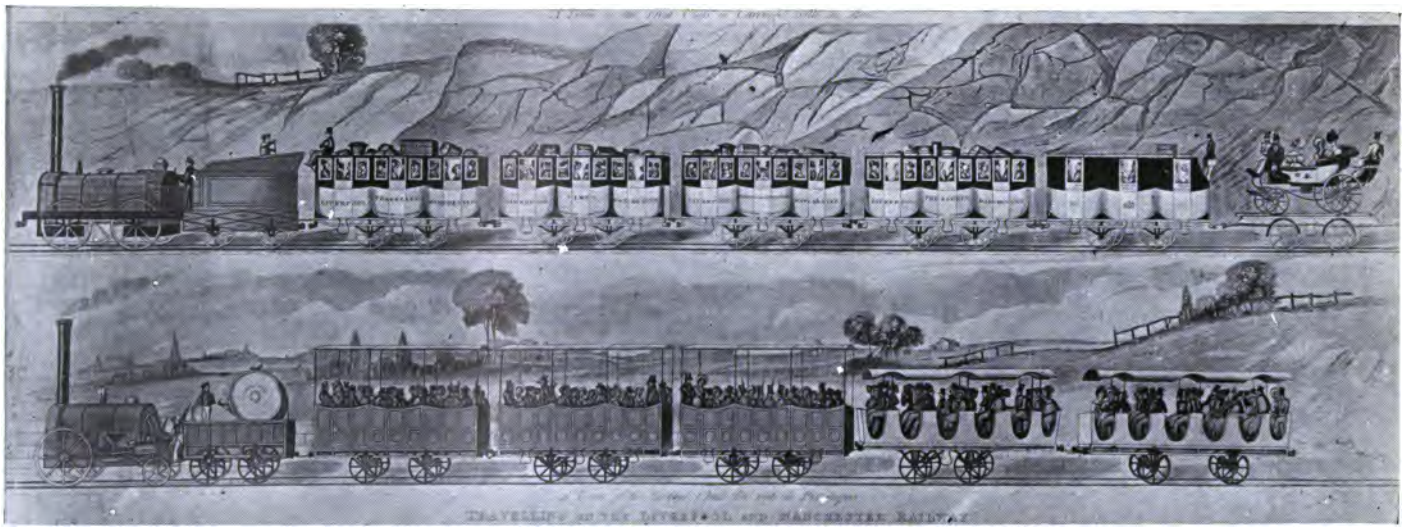
All kinds of arguments were raised against the practicability of Railways. It is almost unnecessary, save for

amusement, to rehearse the popular beliefs of that time. It was stated that they would make travelling by road highly dangerous, that the poisoned air from the locomotives would kill birds as they flew over them, the preservation of foxes and pheasants would no longer be possible, the boilers would burst, and the passengers would be blown to atoms. The suggestion that trains would transport passengers at the rate of twenty miles an hour was scornfully ridiculed by such papers as the *Quarterly Review*, and such visionary schemes were declared to be quite unworthy of notice, as no one would be so foolish as to trust themselves to the mercy of such a machine travelling at this terrific rate, and it was even stated that it would be preferable to be fired from a Woolwich cannon.

The effect of all this obstinate opposition was to enormously increase the capital cost of various undertakings, and it has remained an incubus to this day.

The original intention of Parliament was, that the proprietors of the Railways should be merely toll-takers for the use of their respective lines, and that the general public should be allowed to perform the conveyance services with their own engines and vehicles themselves, in the same way as they provided horses and barges on the Canals, but this was soon found to be impracticable. Many of the Clauses inserted in the Railway Acts were similar to those authorizing the construction of Canals, but there were several exceptions. For instance, Railway Companies did not enjoy what is known as the "eight mile Canal Clause," which enabled the Canal Companies to make Railways to and from their property within that distance. Again, Railways are taxed upon their receipts, whereas Canals were exempted from such a taxation, and, as previously stated, the latter were only rated for parochial purposes on the same basis as the land adjoining their banks.

The first public Railway was opened on the 27th September, 1825, between Stockton and Darlington, but it



1833.

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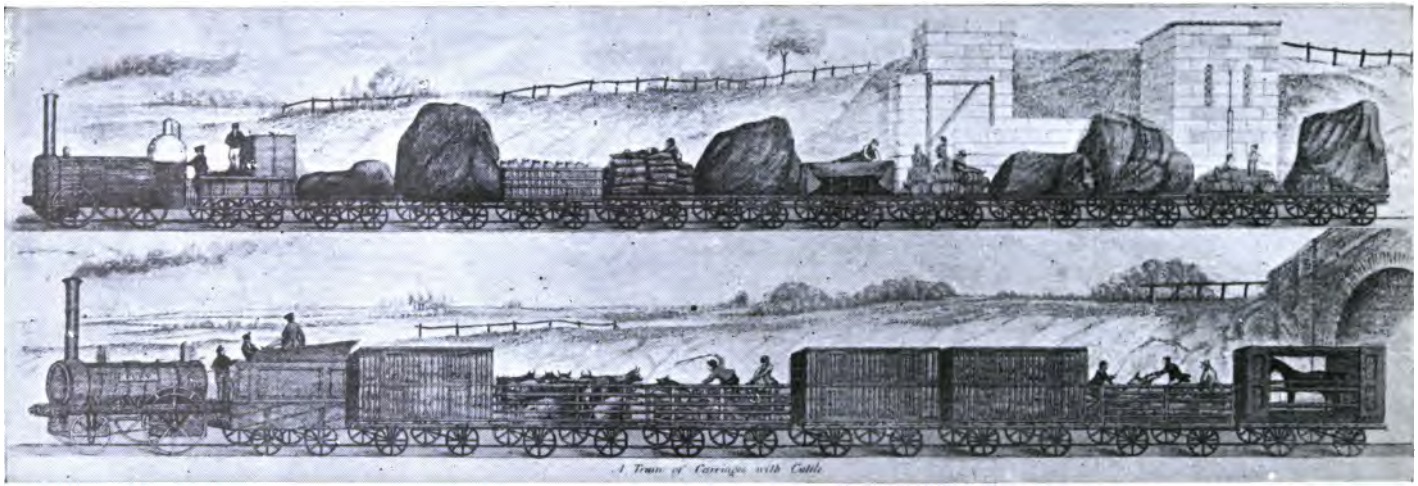

Goods and Live Stock Trains on the Liverpool and Manchester Railway, 1833.

was not until five years later that its first great triumph was achieved.

The 15th of September, 1830, is the red letter day of Railway enterprise. On this date the Liverpool and Manchester line was opened, and among the distinguished persons who witnessed the ceremony were the Duke of Wellington (then Prime Minister of England), Sir Robert Peel and Mr. Huskisson. Prior to the completion of this Railway there had been a public competition for the best locomotive suitable for working the line, which was won by Stephenson's "Rocket." At the appointed time, this engine, together with seven other engines, all built upon the same plan, and twenty-nine carriages took part in the trial trip. The number of passengers carried was about 600, and the journey was satisfactorily completed, though the day's rejoicings were unfortunately marred by a fatal accident to Mr. Huskisson, who was knocked down by the "Rocket," and its wheels passed over his leg and thigh.

The opening of this Railway demonstrated beyond question the enormous benefits that the Country would gain by the general adoption of this means of communication, and within the next eight years more than fifty Acts of Parliament were passed authorising the construction of nearly 2,000 miles of Railway at an estimated cost of £45,000,000.

At this period it took four hours to perform the journey by coach between Liverpool and Manchester, whereas by Railway the distance was covered in 1¾ hours. The fares between these points by coach were 10s. inside and 5s. outside, against the Railway rates of 5s. and 3s. 6d. respectively. That these facilities were immediately appreciated by the public is shown by the fact that in the first year the Company carried on an average more than 1,000 passengers per day, whereas the maximum carrying capacity of all the road coaches previously running between the points was only for 600.

When the London and Birmingham Railway was opened on the 20th July, 1837, there were 3,026 stage coaches, 54 four-horse, and 49 pair-horse mail coaches in use, and for the next three or four years they made a gallant fight against the competition of the Railways. As it was only to be expected, they had to succumb to the superiority of the iron horse.

By the year 1845, Railways had firmly established their position, and the benefits of this newer method of locomotion were reflected in the marvellous development of our vast industrial resources at this period. The facilities afforded for passenger traffic, and the regular and efficient services given for the rapid conveyance of merchandise of all descriptions, gave to the manufacturers the necessary inducement for establishing industries in inland places, and in districts hitherto quite unknown to possess any advantages for the introduction of works, indeed, it soon came to be apparent that no great development of any district could take place that was not provided with Railway communication. The immense economy effected both in capital and labour, and the saving in cost of transit had led to the accumulation of wealth for which there was a lack of opportunity for means of investment, and as the existing lines had been proved to be financially successful, and the proposed lines particularly inviting, the people were only too ready to subscribe to all sorts of Railway speculation. This tendency culminated in the boom of 1845, when no less than 1,263 Bills were deposited, involving a capital of £563,000,000, and requiring a deposit of £50,000,000, but out of these schemes only 120 survived the ordeal of Parliament. Up to this date the nominal capital of the authorised Railways stood at £95,000,000, but the price of the shares, both of Railways in operation, and those of projected lines rose immensely. The Great Western shares of £100, which were quoted at £150 in January, 1845, rose to £228 in September, and shares in other undertakings were sold at still higher figures, it is not surprising, therefore, that unscrupulous Company promoters should have taken

advantage of the existing mania to float all kinds of wild schemes upon the public. The publication, however, of the figures represented by the Bills then deposited for the approval of Parliament created alarm, and a panic ensued.

The serious results to trade are shown by a comparison of the returns for the years 1845 and 1846. In the former year the trade of the United Kingdom reached £167,688,000, so that it had practically doubled in value during the short space of twenty years (the figures for 1824 being £86,096,000). In 1846, the value of the trade done dropped to £150,034,000, notwithstanding the fact that the number of miles of Railway open in the latter year were 3,036, as against 2,441 miles in the year 1845.

Since the inauguration of Railways, many and great have been the improvements which have taken place, all of which may be said to have been of a most beneficial nature, and to-day the standard of comfort in Railway travelling, together with its safety in this Country, is far higher than that attained on the Continent, so that the general public have now come to look upon a Railway journey even for long distances as a very pleasant undertaking. At their inauguration, however, a large number of the wealthy classes could not be persuaded to travel upon them, while history relates that her late Majesty Queen Victoria did not venture upon her first Railway ride until June 13th, 1842, when she went by train from Slough to Paddington.

There are many prints in existence of the early days of Railway travelling, from which can be seen the great advance that has now been made for the comfort and convenience of passengers. In those days the accommodation provided for third-class passengers was simply open trucks, and in many instances they were not provided even with seating accommodation; first-class passengers were conveyed in carriages without windows, sufficient spaces being provided for ventilating purposes only, and a journey by night had to be performed in the dark, as there were no arrangements for

lighting. For some considerable time, those who could afford it preferred to travel in their own private carriages, which were fixed on Railway trucks. Let us compare these facilities with the luxurious accommodation now provided even for third-class passengers. The Great Western Railway Company's "Cornishman Limited" express, which runs between London and Penzance, is fitted up in the most sumptuous manner. Electric light and electric fans are found everywhere. Another feature of this train is the fact that for the first time in the history of British Railways valets and lady's maids are carried in addition to the usual staff, who are prepared to render services to ladies and children. In addition to being the most luxurious train in the world, it also holds the world's record long distance non-stop run between London and Plymouth, 246 miles in 263 minutes—a speed of 55·7 miles an hour. On other British Railways the carriages are comfortably upholstered, well ventilated and lighted, lavatory accommodation is also provided, and for long distances breakfasts, luncheons, teas, and dinners are served on the trains at moderate tariffs.

Among the inventions which have most greatly contributed to the present day high standard of efficiency and safety of our Railways were the introduction of the electric telegraph by Messrs. Wheatstone and Cook, in 1837, and laid down by them on the Great Western Railway between Paddington and West Drayton, in 1839, the improvements effected by the adoption of systems for the mechanical interlocking of points and signals, and the invention of automatic brakes. Without these ingenious devices it would have been quite impossible for the Railway Companies to have satisfactorily dealt with the rapid growth in their business which has taken place.

In 1850 the length of lines open for traffic in the United Kingdom was 6,621 miles, the number of passengers carried totalled 72,854,422, and the weight of merchandise conveyed was nearly 40,000,000 tons. The value of the imports and exports of the Country reached a total of £193,711,000.

Interior of Restaurant Car.

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In the following year the great International Exhibition was held in London, which was visited by no less than 6,000,000 people, when it was demonstrated that England was far ahead of the other Countries in all industrial branches, both in respect of the quality and magnitude of their manufactures. Another event of international importance, which took place in this year, was the laying down of an electric cable between the English and French coasts, and on September 27th, 1851, the first telegraphic message was flashed across the Channel.

As there has hitherto been no industrial census taken, the best guide of the development of the Country is to be found in the increases in population which have taken place, because as we have increased in numbers, so also have we increased in productiveness and wealth. The population of England and Wales in 1650 was estimated at 5,450,000, and in 1750 at 6,400,000; the census taken in 1801 showed a population of 8,892,536. In 1821 the population of the United Kingdom was 20,893,584; in 1851 it was 27,368,736; and in 1901 it was 41,458,721.

The following statistics from the Board of Trade returns show the marvellous growth of Railway traffic during the last 55 years :—

Year.	Miles Open.	Passengers carried exclusive of Season Ticket Holders.	Weight of Goods in Tons.
1850	6,621	72,854,422	X.
1860	10,433	163,435,678	89,857,710
1870	15,537	336,545,397	X.
1880	17,933	603,885,025	235,305,621
1890	20,073	817,744,046	303,110,427
1900	21,855	1,142,276,686	424,929,513
1905	22,847	1,199,022,102	461,139,023

X. Records have been lost.

The total paid-up capital of all Railway Companies in 1905, was £1,282,800,935, and the nett earnings averaged 3·39% upon this capital.

The number of persons employed by Railway Companies in this Country is 581,664.

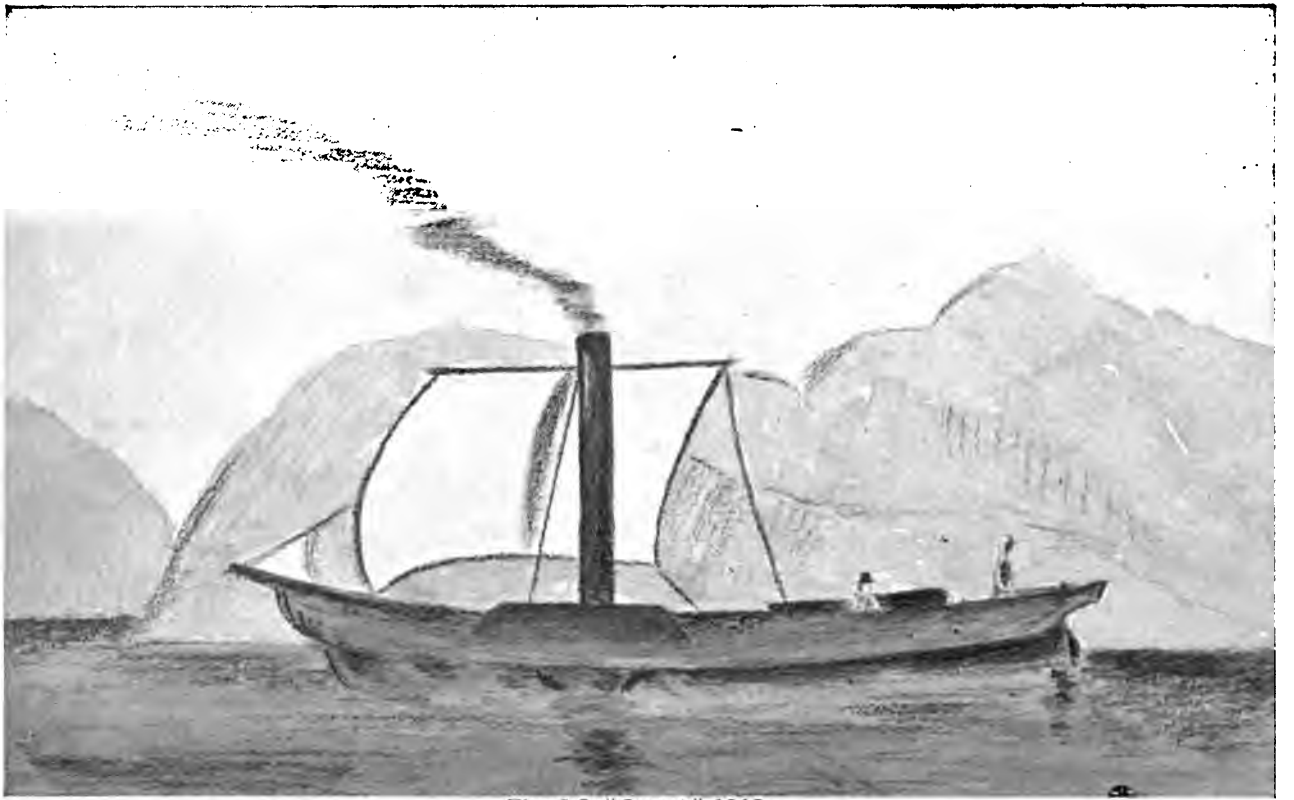
There are no reliable records available of the Coal worked in Great Britain prior to 1860, but the estimated output 100 years earlier was 6,000,000 tons. In 1871, the output was 117,000,000 tons, of which quantity 32,000,000 tons was consumed in our own Iron and Steel industries. The output in 1883, was 163,737,000 tons; in 1903, it was 230,334,000 tons. In 1905, the output was 239,129,000 tons, and the quantity of Coal exported in this year was 97,161,000 tons.

The total output of Pig Iron in Great Britain for the year 1788, was only 68,000 tons. In 1870, it had risen to 4,700,000 tons, and in 1905, it amounted to 9,593,000 tons, of which quantity 8,610,000 tons were used for home manufactures, and 983,600 tons exported. The output of Iron Ore from our own mines in 1905, was 14,591,000 tons, and we also imported 7,533,000 tons.

The great development of our Coal and Iron industries would not have been possible without the assistance of Railways, more especially, as in addition to providing cheaper and more expeditious methods of transport, they also gave in their construction a great impetus to these trades, by their requirements of rails, locomotives, rolling stock, etc., while even to-day they find in Railways one of their best markets for their fuel and renewals.

An idea of the business which the Coal and Iron trades do with Railway Companies may be gathered from the following figures. In 1905, their consumption of Coal was 13,000,000 tons, and the requirements for the renewal and upkeep of the following items of Railway property are very great :—

	Number.
Engines	22,346
Carriages for conveyance of passengers only	51,182
Other passenger vehicles	19,727
Goods vehicles, etc...	725,518



The S.S. "Comet," 1812.

In addition to the above, there are 52,322 miles of single lines of permanent way to be maintained, and also the repairs and renewals to stations and bridges.

It is fortunate that side by side with the great developments already recorded that England should have turned her attention to the improvement of her Docks and Harbours, for, by the invention of steam, even more marvellous achievements were performed in improving communication by sea than had taken place on land.

The first application of steam to vessels is attributed to various individuals. In 1802, however, Symington completed a steam ship, which in March of that year towed two laden barges of 70 tons burden for a distance of 20 miles upon the Forth and Clyde Canal, but although the trial was considered satisfactory, he could not prevail upon the proprietors of the Canal to adopt the new idea of towing, and the steam ship was subsequently beached and ultimately broken up.

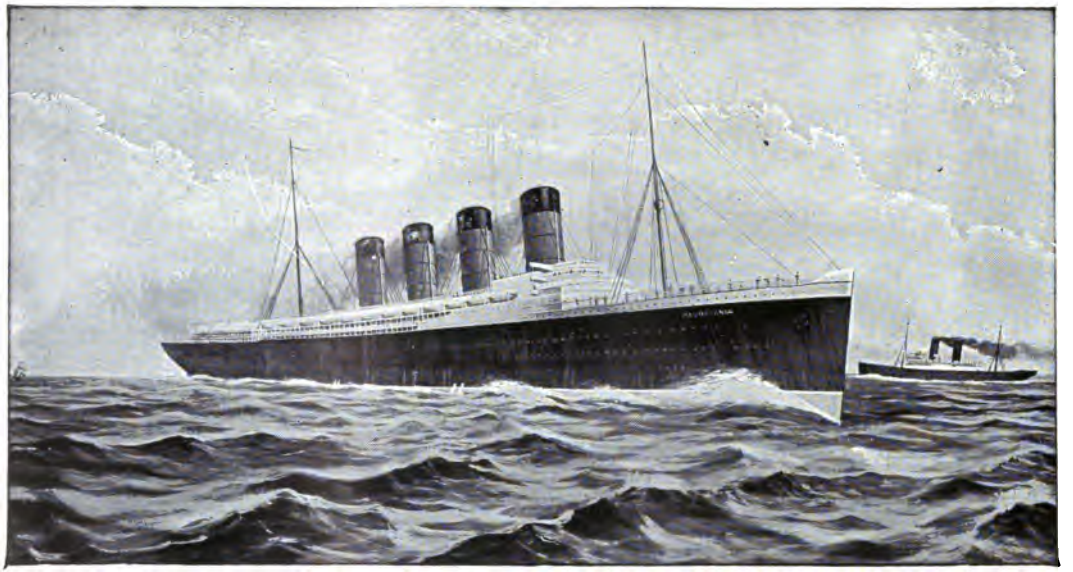
The first steam vessel in Europe regularly employed for carrying passengers, ran between Glasgow and Helensburgh in 1812, at a speed of six miles an hour. There is a model of this steamer, which was named "The Comet," in the Glasgow Museum, and the case also contains the original compass and bell.

In 1820 the tonnage of ships belonging to the British Empire amounted to 2,648,000 tons, but out of this total the tonnage of steamers was only 8,000 tons. The enormous dimensions that this business has now attained may be seen from Lloyd's Register of Shipping for 1906, which gives the tonnage of British steamers as 16,166,748, and of sailing ships as 1,444,348, being a total tonnage of 17,611,096, representing nearly one-half of the total shipping owned in the world. These figures, however, only give but an inadequate idea of the carrying capacity now and one hundred years ago. At the commencement of last century the ships of the East India Company occupied about eighteen months for the double voyage from London to India and China and back.

The first British steamer to cross the Atlantic was the "Sirius," which left Cork on April 5th, 1838, and reached New York on April 23rd, and having run short of coal she had to burn everything else available. On the same date there arrived at New York the steamer "Great Western," which had left Bristol three days after the "Sirius" had left Cork. The quick passage of 14½ days made by the former steamer was at that time considered to be a marvellous achievement. The Ocean palaces of to-day, such as the "Mauretania" and "Lusitania," will perform the passage between Queenstown and New York in about five days. These steamers belong to the Cunard Line, and represent the greatest achievement of the shipbuilding industry.

In 1823 the journey from London to Calcutta occupied 113 days, whereas now the Peninsular and Oriental Liners perform the passage from Plymouth to Bombay in 17 days, and by these boats the mails from London to Bombay via Brindisi occupy 12½ days. The opening of the Suez Canal has done much to accelerate and develop our Trade with the East; this Canal was opened in 1869, and in 1870 the number of vessels making use of it was 486, and the nett register tonnage 436,600 tons; in 1905 the figures were 4,116 and 13,134,105 tons respectively.

The total length of the Suez Canal is 99 miles, the width 121 feet, and the maximum draught of water allowed for vessels using the Canal is 27 feet, so that this route is not available for some of the large steamers now afloat, such as the "Lusitania," which is a quadruple turbine steamer of 32,500 tons. She is expected to realise 25 knots in speed, and her actual dimensions are :—length 785 feet, breadth 88 feet, depth 60 feet, load draught 33 feet, and horse-power 68,000. In view of this it is not difficult to foretell that this waterway will soon be referred to as being obsolete, that in its original construction the promoters should have provided for an anticipated growth in the dimensions of tonnage, and that a depth of forty feet or more should have been given. It will



The Four Screw Turbine Steamer "Mauretania," 1907.

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no doubt be further stated that the first cost of providing for future developments would have been small as compared with the cost of putting the house in order to-day. Such arguments as these we meet with to-day in reference to Docks and Harbours, where the accommodation has been outstripped by vessels, which, but for their size, would otherwise visit these Ports, it should not, however, be forgotten that Docks like other industries have to live in the present. In promoting a Dock, only such money can be spent in its equipment that it will be possible to earn dividends upon, within a reasonable period, and to provide for the future to any great extent, would make the property valueless except to posterity, or upon the other hand such dues would have to be levied on the existing business as would enable dividends to be paid upon the capital expended. The latter course could rarely be adopted, as in nearly all cases there is competition between the different Docks for business, and their charges are more or less governed by this factor.

An idea of the enormous growth in the trade of the United Kingdom, which our Docks and Harbours have had to provide for during the last fifty years will be seen by the following extracts from the Board of Trade returns :—

	Imports.	Exports.	Total.
	£	£	£
1854	152,389,053	115,821,092	268,210,145
1870	303,257,493	244,080,577	547,338,070
1880	411,229,565	286,414,466	697,644,031
1890	420,691,997	328,252,118	748,944,115
1900	523,075,163	354,373,754	877,448,917
1905	565,019,917	407,596,527	972,616,444

During recent years Continental States have emulated British enterprise in the improvement of facilities of communication. More especially has this been the case so far as the Ports of Antwerp, Rotterdam, and Hamburg are concerned, where money has been spent on a most lavish scale, in order to equip the Wharves and Docks at these

places with the most up-to-date machinery that engineering skill can devise, for giving the best possible despatch to vessels trading with these Ports. To the owners of the huge steamers now afloat "time means money more than ever before," and it is because of this that British shipowners would more readily accept a freight on the market to one of the above Ports, than they would do in the case of London, which to-day bears a very bad reputation for despatch.

In this Country there is a variety of Dock Ownership. For instance: the London and Cardiff Docks are the property of Public Companies, Liverpool, Glasgow and Swansea are worked by Trustees, Hull, Southampton, Barry and Port Talbot are the property of Railway Companies. This difference in ownership represents a variety of interests. In the case of London and Cardiff they are worked for the benefit of shareholders, to whom the largest possible profit is paid out in dividends. Liverpool, Glasgow and Swansea are worked by the Trustees in the interest of the trade and traders of the district, after payment of a fixed amount of interest upon the borrowed money. The other Docks mentioned may be regarded as feeders for their Railways, or the Railways as feeders for the Docks, and these properties would be managed somewhat on the principle that it does not matter "what is lost on the round-abouts if it is more than covered by the gain on the swings."

Under the circumstances explained it will be exceedingly difficult for the British Docks to compete with the Municipally owned Continental Ports, where the citizens do not regard the Docks themselves, as sources from which it is necessary to derive a profit, but rather look upon them as a means of attracting trade, and it is upon trade itself that profits should be made, and the Country at large benefited, and it is because of this that money has been expended upon such a liberal scale.

On the other hand, a comparison between Continental Railways and British Railways is very much in favour of the

latter, the passenger services being more frequent and comfortable, and the transport of merchandize far more expeditious. The rates charged in this Country also bear favourable comparison with those charged in other Countries, especially when it is remembered that the cost of construction per mile on the Continent has been only one-half of that expended in the construction of Railways over here.

The advantages to be derived from regular and expeditious means of communication cannot be over-estimated, and to such a state of perfection has Railway transit been brought in this Country, that to-day the Trader can rely to an hour or so on the time his goods will be delivered, so that at the present time business is almost entirely done upon the "hand-to-mouth principle," which enables the Merchant to do double the amount of business that he did in the past without increasing his own warehouse accommodation, thus keeping his rateable value down to a minimum. By introducing such a reliable service, however, the Railway Companies have added to the burden of their own assessments. Then, again, many of the large works in this Country have only sufficient siding accommodation for storing one day's supply of their requirements, it is, therefore, most essential to them that they should have a reliable service, as any breakdown in same would immediately have the effect of stopping their works. The insufficiency of siding accommodation at works frequently results in Dock and Railway Companies having to provide accommodation for storing traffic, which leads to congestion and delay in dealing with other business, and to wagons being kept under load that are required elsewhere. To this cause must be attributed many of the complaints of delay in the discharging of vessels rather than to any defect in the system or the working of the Ports. Broadly speaking, it may be confidently stated that although many works are now doing a very much larger volume of business than they were doing some years ago, they have not increased their accommodation, whereas Railway Companies

are spending money year after year in providing additional sidings; the cry is still for more Railway sidings and more Railway wagons, although the present supply is ample for all requirements if wagons were only promptly released by the Traders. The position with regard to the Collieries is much the same as at the works, in many cases they have doubled their outputs several times over without providing additional room.

Whilst it may be a debateable point as to the exact degree in which Railways are responsible for the development of industrial districts, or that such districts are responsible for the growth of Railways, it may be taken as a fact that Railway enterprise has entirely built up many of the prosperous health resorts and watering-places of the Country, and by the issue of cheap tickets for long or short periods, they have enabled the inhabitants to get that change of air and scenery which is daily becoming more essential owing to the energy now expended in the race to keep pace with the times. Then by the introduction of an exceptionally low scale of workmen's fares they are doing much to mitigate the evils arising from overcrowding, and will, undoubtedly, in the future, assist in a settlement of the "housing problem," which is certainly the most urgent social question of the day.

In conjunction with Railways, Ships have been the means of spreading civilization and enlightenment throughout the World; and, whereas, in early times, Ships were more frequently used by passengers "who were leaving their country for the countries good" than for legitimate purposes, the great Ocean steamers of to-day have their carrying capacity taxed to the utmost limits in providing for the comfort of those who are travelling to all parts of the World in search of health, pleasure or profitable enterprise.

A most striking testimony of the importance of transport facilities is to be found in the records of the last Colonial Conference, and in the fact that the nett results of the deliberations between the Home Government and representa-

tives from all parts of the British Empire has been to recommend the consideration of a scheme for improving the means of communications with the different Colonies. The present moment, therefore, appears to present a suitable opportunity for considering whether or not something should be done to remove some of the difficulties which Railway Companies in this Country have to contend with, as unless steps are taken in this direction, it will be a matter of impossibility for the Companies to maintain their present state of efficiency, and at the same time pay to their Shareholders even the low rate of dividend which they are receiving to-day.

The absurdity of the statement that Railway rates and charges are crippling the trades of this Country is apparent, in view of the constant expansion of business which is taking place year after year, and in the fact that many of the great industrial concerns are to-day paying more than 20% per annum in dividends, and at the same time adding large amounts to their reserve funds, whilst the percentage of nett receipts to capital of the Railways in the United Kingdom for the year 1905, only averaged 3·39 per cent.

The statement has already been made that England owes her present prosperity, in a very large measure, to her Railways, with which she was first in the field, and the Manufacturers were thus early able to get a footing in the markets of the World.

A calculation of the saving by means of Railway transit since its inauguration, over other methods of transit, would show some stupendous figures, and Railways have also indirectly conferred very great benefits upon the community at large in other directions, which, at this date, are apt to be overlooked. For instance, without Railways it would have been impossible to develop the deep sea fishing, which is now a great industry in itself. The construction of Railways led to the abolition of the road and bridge tolls, and also enabled Sir Rowland Hill to introduce his penny postage scheme,

which has been rightly described to be one of the greatest reforms of the nineteenth century.

In view of what has been accomplished by Railway enterprise, and the great benefits they have conferred upon the Nation, it is to be regretted that something has not been done to enable the Shareholders in Railway Companies to participate in the national prosperity of the last few years, for although trade has been exceptionally good, Railway shares have, as a rule, steadily declined, and the outlook in this respect is more gloomy than ever, and under existing circumstances is likely to continue, which surely cannot be regarded as being an equitable condition of affairs.

Transit is, in a sense, an article of commerce, but, unlike other articles, it is practically impossible for a Railway Company to increase the cost of what they provide, consequently a boom in trade is rather a mixed blessing to themselves, because it means that they have to pay more for their requirements of Coal and all other descriptions of materials, and for the year 1907, it is very probable that the Railway Coal Bill will exceed that of the previous year by upwards of £1,000,000 due to the advance in price, which has taken place, without their being able to recoup themselves, as it does not follow that when prices are high that there is sufficient extra business being done over the Railways to enable them to do this. In all other branches of business the Merchants and others are able to cover the extra cost of their raw materials by increasing the cost of what they sell, and they are thus able to meet the demands of their men for increased pay without in the slightest degree reducing their own profits. It is certain that at the present time nearly all the trades of the United Kingdom could bear a slight increase in their Railway rates, and they would then still be able to enjoy quite as large profits as they have ever done; it is, therefore, unfortunate that Railways cannot increase their rates within the maximum allowed by Parliament, in the same way that the Canals had the power to do. Unless the Nation

is prepared to see the Railway dividends still further reduced, it will be impossible for this position of affairs to go on much longer, because such rigid economy is, to-day, of necessity, being exercised by the various Managers, that it is becoming difficult to get men to enter the Railway service, which, only a few years ago, was looked upon as very congenial employment. Especially is this the case in Colliery and Manufacturing Districts where the high rate of wages attracts men into other branches of labour.

It will be a sad day for this Country when the man who has a natural bent for Railway Work turns his hands to other means of obtaining a livelihood for which he is quite unsuited, but the circumstances are such to-day, that there is a growing tendency in this direction.

The absolute necessity for keeping the employees of Railway Companies up to a high standard of efficiency will be readily admitted by the travelling public, whose safety depends upon this and eloquent evidence of their efficiency in this respect is to be found in the Board of Trade returns of accidents. In 1904, out of 1,198,773,720 passengers carried (exclusive of season ticket holders) there were six killed, and in 1905, out of 1,199,022,102 passengers, thirty-nine were killed, twenty-one of this number being killed in a lamentable accident on an electrical Railway. These figures, of course, do not include accidents where the passengers have been at fault, such as alighting from a train in motion, etc. They are very much better than any of the foreign Railways can show, but satisfactory as they are, I should prefer that the standard of our efficiency should be measured by the manner in which the Railways are conducted from one year's end to the other, and in the excellent way that they cater for the reasonable requirements of the public.

The question that now arises is, how long can we continue to maintain our supremacy in the comfort and safety of Railway travelling over other Countries, and what should be done in this direction? The "man in the street" would no

doubt answer that the Railway Companies should march with the times, throw upon the scrap heap everything not of the latest pattern, and improve the conditions of service generally, but it should not be forgotten that a Railway is primarily a commercial undertaking, and is expected to pay a return for the capital invested. Numbered among the shareholders are a number of individuals, who are mainly dependent upon the amounts they receive in dividends. They are, in many instances, the descendents of those great men, who, in the past, by their indomitable energy and perseverance succeeded, in spite of the most formidable opposition, in laying the foundations of the existing Railway systems, which have enabled princely fortunes to be made in other branches of commerce. We are, however, living in an ungrateful age, and one of the results of present day civilization seems to be to develop man's naturally selfish proclivity.

Since Parliament, in 1840, first conferred upon the Board of Trade statutory powers for the supervision of Railways, in order to provide for the safety of the public, several subsequent Acts have been passed enlarging these powers, which have entailed considerable expense upon the Companies in fulfilling the requirements, and, indeed, the cost of preparing returns in connection therewith amounts to a very considerable item every year.

There is no doubt that the Government is within its rights in exercising a certain amount of supervision over Railways, because their existence is due to powers conferred upon them by Parliament, but it is a debateable point as to how far such control can be advantageously exercised. The intervention of the State in regard to Railways has so far been in three directions—one in respect of the safety and convenience of the public; another in respect of matters affecting the employees of Railway Companies, and a third in respect of Railway rates and charges. In legislation affecting the safety of Railway servants and the public, it is only fair to the

Railway Companies to explain that Parliament has merely made compulsory the improvements which they had themselves initiated, and it may be accepted as a true statement, that even to-day no question of expense would be allowed to stand in the way of the introduction of any devices that the genius of man could invent that would prevent the possibility of accidents occurring. So far as the intervention of the State between the Companies and their employees is concerned, such interference is certainly hurtful to the maintenance of discipline, which is so necessary in carrying on efficiently the working of a Railway, where smartness and punctuality are such important factors. In connection with the powers possessed by the Board of Trade with regard to rates and charges, it certainly appears to be wrong in principle that it should be in a position to call upon the Companies to make certain alterations at enormous expense, without providing that such expenditure should be recoverable, especially as such alterations are made for the benefit of the community at large who should be called upon to pay for what they receive, whereas now the money is taken out of the pockets of the shareholders.

Railways are the arteries through which the life blood of the Nation's trade flows, it is, therefore, of vital importance that their efficiency should not be endangered, and yet we find that they alone amongst all our great industrial concerns are unable to participate in the national prosperity through the circumstances already explained.

Passing now from a consideration of the relations between the Imperial Government and Railways, we will examine for a moment the position in which they are placed with regard to Municipalities, where the situation, in view of all the circumstances, is really most discouraging, owing to the enormous growth of local taxation.

In 1891, the total amount paid by the Railways of the United Kingdom in Government duty, rates and taxes, was £2,567,690, and in 1905, under this head, they paid

DEVELOPMENT OF GLAMORGANSHIRE.

In selecting Glamorganshire as the field in which to examine the transition in trade which has taken place, it may be as well to explain that this has been done for the reason that the history of its commercial progress will probably be of more than ordinary interest, because the development of this County during the past century, whether measured by the increase which has taken place in its population or by the increase in its commercial prosperity, has been greater than that of any other County in the United Kingdom.

Mr. Phillips, who has been previously quoted from, also wrote in 1790 :—"Wales is capable of great improvements by Canals, but has been long neglected from want of proper encouragement. Her Mines of coals, copper, lead, iron ore, and others of less consequence are inexhaustible, and the contents of her mountains *even in this enlightened age* are still unknown. The valuable timber which this Country produces, although so much wanted for ship building, decays as it stands, and the product of the mine in many places lies in its natural state for want of a proper conveyance to a market. The improvement made by Canal Navigations in the Counties bordering on the noble river Severn have raised at last a laudable spirit of adventure in the gentlemen landowners in a part of South Wales, which beyond a doubt will be crowned with success, and create an emulation for improvements in other parts of the Country equally capable of them, and although this kind of improvement is as yet but in its infancy, it is to be hoped it will meet with proper encouragement from those whose interest it is to promote the welfare of their Country, since, by so doing, they promote their own."

It is somewhat surprising that Glamorganshire, which has been the cradle for the introduction and foundation of some of the greatest industries of the United Kingdom, should have allowed more than twenty years to elapse before following the lead of other districts in the making of Canals. With the exception of the privately owned Canal of Mr. Tennant, it was not until the "Canal boom" of 1790, when most of the Canals already opened in England were returning their owners 100 per cent. upon their capital expenditure per annum, that any definite steps were taken in this direction. The Canal constructed by Mr. Tennant and called the Neath and Swansea, Red Jacket, and Junction Canals, was completed in 1789, and it connected by means of two locks the tidal river of Neath with the river Tawe.

The following are the dates of the opening of the other local Canals, together with a few particulars respecting each.

The Neath Canal Navigation obtained its Act for the construction of the Canal from Abernant to the Brickfield, Neath, in the year 1790, and for the extension from that point to Giant's Grave in 1798. This Canal was opened for traffic in 1803; it is thirteen miles long, it has nineteen locks, and crosses the river Neath by means of an aqueduct about half way between Resolven and Aberdylais. In 1824 a connection was made with the Neath and Swansea Canal also necessitating the construction of a fine aqueduct of thirteen arches across the river Neath.

The Glamorganshire Canal Navigation obtained its Act in 1790 for constructing the Canal between Merthyr and Cardiff, which was completed to the latter place in 1794. In 1796, a further Act was obtained to extend the Canal to the sea, and in 1798, the first vessel entered the sea lock. This Canal is 25½ miles long, and has fifty locks. It has been since the year 1883, under the control of the Marquis of Bute, who has engaged to pay 6½% on £100,000, the original share capital, and 4% upon £4,000 supplementary capital per annum for a term of fifteen years, at the end of which time he had

the right of purchasing the property out and out by paying 22½ years purchase of the agreed dividend. This Canal was connected with the Neath Canal by means of a branch Canal to Aberdare, and from that point there was a tramway passing through Hirwain to Abernant, Glyn Neath.

The Swansea Canal Navigation Act was passed in 1794, and the Canal constructed in 1798. It is 16½ miles long, and has thirty locks. In 1872, this undertaking was vested in the Great Western Railway Company, each £100 of Canal Stock being exchanged for £202 of Great Western 5% Stock.

The Act for the Penclawdd and Loughor Canal was obtained in 1811, and the Canal was shortly after opened for traffic. It was not, however, successful, and has been filled in for a number of years.

With the exception of the last mentioned, the other Canals referred to were, in their palmy days, equally as successful as the best paying English Canals, and the capital expended in their construction was returned in dividends to the proprietors several times over.

Up to the time of the opening of the Canals, the merchandise of the hilly districts of Glamorganshire had to be carried by means of pack horses and mules, and as already stated, even the main roads at this period were in a shocking condition. The cost by this means of transit was about 2s. 6d. per mile for as much as a horse could carry.

There are no statistics available as to the commercial progress of this County in early times, but in the report of the first Royal Commission appointed to enquire into the coal industry, it is stated that the manufacture of iron was being carried on in South Wales as early as the 15th century. At this date charcoal was used for smelting purposes, and the first operations were carried on in wind furnaces on the mountain tops, where the ruins are to be seen to this day. Although coal was not used at this period for manufacturing purposes, there is no doubt that it had been worked previously to this date for household purposes. One

of the very early writers describes anthracite coal as a "hard coal which is burned in chimnies and grates of iron, and delighteth to burn in dark places."

In 1755, there were 109 furnaces in England and Wales which produced 18,000 tons of iron, and we were then importing from Sweden a similar amount, which was both cheaper and of better quality than that produced by the English process of manufacture. The quantity of wood consumed in making the 18,000 tons of iron was 198,000 cords, equal to 495,000 tons, so that to manufacture last year's output in this Country of 9,593,000 tons, it would have required 263,075,195 tons of timber. It would be interesting to know how long the existing supply of wood in Great Britain would be able to meet the demand if we had to depend upon this method of manufacture to-day. It required 27½ tons of wood to manufacture a ton of iron in the early days. When pit coal was first used 9½ tons of coal were necessary to make a similar quantity. To-day, by the introduction of various improvements in the process of manufacture less than 2 tons of coal is used in producing a ton of iron.

Coal was being used for smelting copper ore at least a century and a half before it was successfully tried for smelting iron ore. The first works carrying on this business in Glamorganshire was the Mines Royal Copper Works, Neath Abbey, which was erected under a Charter granted by Queen Elizabeth. The selection of this site was due, in the first instance, to the historical associations of the Abbey attracting a visit from a number of gentlemen interested in the Copper Mines of Cornwall, who, combining business with pleasure, discovered that this spot would enable them to solve the increasing difficulties they were meeting with in getting wood for carrying on the smelting in Cornwall, and by bringing the ores to this side of the Channel they hoped to be able to make use of Welsh coal for abstracting the metal. Colonel George Grant Francis gives the dates of the establishment of the Copper Smelting industry in Glamorganshire in

the respective districts as follows :—Mines Royal 1584, Melyncrythan 1690, Swansea 1717, Taibach 1727, Penclawdd 1800, Loughor 1809, and Cwmavon 1837. The works at the latter place is remarkable in the surrounding districts for its enormous chimney carried up tunnelwise to the top of the adjoining hill, and rising to a height of 1,200 feet above the Works, giving the mountain an Etna like effect by the volume of smoke. The first consignment of ore for the Mines Royal Works was shipped from St. Ives, and although the cargo was only 15 tons, the boat took seven days to load. The make of copper at these works in the 18th century was 18 tons per week, which required 315 tons of coal. With regard to the latter, Colonel Francis gives an extract from the Manager's diary for October, 1796 :—" Mr. Parsons should send us better coal and better measure. The furnacemen left their work this morning on account of bad coal." The sea freight for copper to London at this time was 45s. per ton. The substitution of coal instead of charcoal for smelting iron ore was first successfully accomplished by Mr. Darby at Coalbrookdale in 1735, and twenty years later Mr. Bacon obtained a 99 years' lease of a large mineral area in the neighbourhood of Merthyr Tydfil at a rent of £200 per annum. Later this property was sub-let into different lots, upon which began to be established the very important and far-famed works of the Merthyr district. In the year 1788 there were six coke furnaces in Glamorganshire, which produced 6,000 tons of pig iron, and there were seven charcoal furnaces producing 4,300 tons. The latter quantity, however, includes the make of pig iron from three charcoal furnaces in the Counties of Carmarthen and Monmouth. The development of the iron industry leading in its turn to the opening up of collieries, rendered it absolutely necessary for more economical and expeditous means of transit than that to be obtained from the utilisation of mules, which were then the only means of transport over the hilly ground between Merthyr and Cardiff, and it was through the enterprise of the Crawshay family

that the Glamorgan Canal became an accomplished fact. A little later Trevethick was busily employed upon the construction of a locomotive, and on the 21st February, 1804, this engine conveyed along a tramroad near Penydarren seventy persons and ten tons of bar iron at a rate of five miles per hour. In this year also was passed the Act "for making and maintaining a Railway or Tramroad from the town of Swansea into the Parish of Oystermouth, in the County of Glamorgan, and for the hauling or drawing of waggons or other carriages passing upon the said Railway, with men, horses or *otherwise.*"

By the introduction of the word otherwise, it was evidently intended to cover the use of engines, and this Act may therefore be considered the first in the Country in which steam was contemplated as the motive power.

The output of Iron from the Merthyr District when the Glamorgan Canal was first opened was only about 10,000 tons per annum, but in the year 1825, the following quantities of iron were forwarded over this Canal by the respective firms mentioned :—

Wm. Crawshay & Sons	24,710
Dowlais Iron Co.	16,984
R. J. & A. Hill	12,073
Penydarren Iron Co.	10,440
Aberdare Iron Co.	6,807
	71,014

and in the year 1839, the out-turn from these works amounted to 120,111 tons. In this year the output of pig iron from South Wales and Monmouthshire works was 453,880 tons, which required in its manufacture 1,361,640 tons of coal.

The figures above quoted, in the absence of statistics relating to the coal trade, will furnish an idea as to the progress of that industry, as the most important collieries were then owned by the iron companies, and chiefly worked for their own requirements. The Custom House Returns, will, how-

ever, demonstrate more clearly the great transformation that has taken place in this business, and furnish very interesting reading. In the year 1704, eight chaldrons (20 tons 16 cwt.) of Coal were landed at Cardiff from Tenby, on which there was a duty of £2 10s. In the year 1745, 38 tons of coal were imported into Newport from Bristol. The earliest record of the shipment of coal from Cardiff is on the 13th April, 1746, when 20 tons of coal was exported, and fifty years later the total quantity was only 1,069 tons. The quantities of Welsh coal exported to London in 1745, 1755, and 1765 were :—

1745—Ex Milford, 1,516 tons.

1755—Ex Milford, 2,517 tons; ex Swansea and Neath, 186 tons.

1765—Ex Milford, 3,122 tons; ex Swansea and Neath, 45 tons.*

The works served by the Neath Canal, and which were in existence before the inception of that undertaking, were the Melincrythan Copper Works, owned by the Mines Adventurers Company, who at one time obtained their supplies of copper ore on the backs of mules from Cardiganshire, the Melyn-y-court Furnaces, the Ynis-y-gerwen Tin Mills, and the Aberdylais Forges. These works obtained their supplies of coal from the neighbouring collieries, which were the first to be opened out in the South Wales Coalfield.

In the early part of last century, Giant's Grave was one of the chief places for the shipment of coal in the Bristol Channel, and in 1825, it was given in evidence before Parliament in connection with the promotion of a ship Canal between the English and Bristol Channels, that upwards of 1,200 vessels had been dealt with at its wharves during the year 1824, and this evidence appears to have been of great assistance in getting the Bill through Parliament, in reference to which the *Cambrian* for July 9th, 1825, says :—"We have

*Mr. Forster Brown gave these figures in a paper read before the Members of the Engineers' Institute, in 1874.

great pleasure in announcing to our readers that the Bill for the Ship Canal between the English and Bristol Channels passed into law on Wednesday last. As regards the trade of South Wales, we consider this the most important Act which ever passed the legislature." It only remains to add that this scheme, which was considered of such great importance was not proceeded with, probably due to the advent of steamers, which were not dependent upon the wind for negotiating the Lizard.

Coal was sent down over this Canal from a colliery near the site of the new pits on the Whitworth Estate, by means of a tramroad. This was one of the most disastrous speculations in the history of the South Wales Coal trade, for it is said that the first tramload of coal tipped into a barge at Aberdylais had cost £180,000, and a further large sum was subsequently lost before the Colliery was abandoned. Between Neath and Giant's Grave the Canal had a cut, or waterway passing through the site upon which the engine-sheds of the Great Western Railway Company now stand, which served the old Eaglesbush Colliery.

Passing now to the Tennant Canal, we find an account of this undertaking in the *Cambrian*, dated May 14th, 1824 :— "We yesterday witnessed with much satisfaction, in which "we were heartily joined by some thousands of spectators, the "opening of Mr. Tennant's Junction Canal. Ten barges fully "laden with coal, accompanied by a brass band, were safely "conveyed from the colliery of Mr. Protheroe, in the Vale of "Neath, and delivered at the shipping place in our harbour. "The health of 'George Tennant, Esq., and may his Canal "return him a large interest for all the capital expended on it' "was drunk with great enthusiasm, accompanied by three "times three."

In a later issue the Editor writes :—"The success which "has attended Mr. Tennant's new Canal and works at "Swansea has, we believe, seldom been exceeded by any "new works of like description. The Canal has been open

"seven weeks, and 376 barges with 5,930 tons of coal and "timber have already passed over its line. No inconsider-"able number of passengers have also been borne upon it, as "the inhabitants of Neath and vicinity are allowed to navigate "it with their families, servants, shop goods and parcels, free "of all charge. Since the opening, 49 ships have cleared "from the new shipping place attached to this Canal, to "which the traders have given the name of Port Tennant, "bearing to distant places 4,484 tons of culm. We have also "great pleasure in being able to announce that during this "period a larger quantity of coal and culm has been borne "on the Swansea Canal, and also upon the Neath Canal, than "had ever before been carried on either of them within the "same length of time, and that on both these concerns the "dividends declared within the present month exceed those "in the preceding year."

At this period the quantity of coal shipped from Cardiff was about 70,000 tons per annum, from Giant's Grave 120,000 tons, and from Swansea about 150,000 tons. The quantity of coal conveyed over the Swansea Canal in 1818 was 77,245 tons, and in 1824, 124,551 tons. The coal brought down by the Swansea Canal was shipped at wharves on the banks of the River Tawe, and that brought over the Tennant Canal at Salthouse Dock, near the present East Pier. Vessels were regularly loaded and discharged at the latter place between the years 1824 and 1880, when alterations became necessary through the construction of the Prince of Wales' Dock. The present terminus of the Canal is at that Dock, near the entrance from the sea. The Swansea Canal has a connecting lock with the North Dock.

Although coal had long been used for smelting copper ore, the real development of the South Wales Coalfield began with the opening up of collieries by the great ironmasters to furnish coal for their own requirements, and a further impetus was given to the business, when about 1836, on the discovery of the very valuable properties of the carbonaceous coals in

Merthyr and Aberdare districts, the steam measures there were developed. There were also at this time several collieries working coal for sale purposes, independently of those owned by the ironmasters. The largest of these was the Dinas Colliery, owned by Mr. Coffin, which was the first Colliery to be opened in the Rhondda Valley, and in the year 1839, which was the year prior to the opening of the Taff Vale Railway, the output from it amounted to 1,000 tons per week.

At this date only the upper coal measures were being worked in the Rhondda Valley, and it was not until about ten years later that the steam coal, which has since become known throughout the World, was first worked in this district.

When the Canals of Glamorganshire were first brought down from the valleys to the seaboard, there were no docks constructed upon this side of the Bristol Channel, and the wooden sailing vessels were then discharged or loaded lying on the ground, alongside the wharves, when the tide was out. In those days a ship carrying 200 tons was considered a large vessel, but even at that early date the tendency was to increase the size of tonnage, and with the advent of larger ships and the introduction of steamers began the construction of the local Docks and the Railways in conjunction therewith, which assisted in a very large measure the enterprising spirit of the inhabitants, who spent energy and money in developing the natural resources of this County.

Glamorganshire has a coast line of about sixty miles, and now possesses excellent Docks at Swansea, Port Talbot, Barry, Penarth and Cardiff. There are also Docks at Briton Ferry and Porthcawl, but they have become somewhat obsolete owing to the great growth in the size of tonnage during recent years. Iron ore is imported for the works at Briton Ferry at the wharves on the Neath River, and the Main Colliery Company has coal shipping staiths on this river also.

Swansea is the oldest of these Ports, and at one time the limits of the "Port of Swansea" extended from Oxwich, in the West, to Chepstow, in the East, Cardiff, Newport and Chepstow being then sub-ports of Swansea.

Up to the year 1852, shipping was carried on at wharves on the River Tawe, and it was not until the 1st January of that year that the North Dock was opened, followed by the opening of the South Dock in September, 1859, and the Prince of Wales' Dock in 1881.

Briton Ferry Dock was opened in 1860, and in its early days considerable quantities of coal were shipped therefrom, and iron ore was imported for the Aberdare district.

Port Talbot was the first of the Ports upon this side of the Bristol Channel to possess an entrance lock and dock from the sea, for deep draft vessels. The Act for its construction was obtained in 1834. A new entrance lock and dock, in connection with the old dock, was completed in 1903.

Porthcawl Dock was opened in 1866.

Barry—The first Barry Dock was opened on July 12th, 1889, and the second dock on the 10th October, 1898. The Lady Windsor deep water lock leads direct from the sea to Dock No. 1, and vessels drawing thirteen feet of water can enter and leave the dock through this lock at any state of the tide.

Penarth—The Harbour was opened in 1856, under the Ely Tidal Harbour and Railway Act of 1856, and the dock in 1859.

Cardiff—The West Bute Dock was opened in October, 1839, the East Bute Dock in 1855, and the Roath Dock in 1887.

The docks of Gamorganshire and the districts generally are excellently served by a net work of Railways, and during the last fifty years this County has yielded a rich harvest to Parliamentary Counsel and others by the promotion of the various Railway undertakings, and in nearly every instance

such enterprise has been fully justified in the successful results.

The Great Western, London & North Western, and Midland Railway Companies have direct communication with the County Glamorgan, and in the case of the first-named, the traffic handled by them in this district is enormous.

The premier local Railway is, undoubtedly, the Taff Vale, which was one of the first to be constructed in Glamorganshire. This Company was incorporated under Act of Parliament dated 21st June, 1836, to construct a Railway from Merthyr to Cardiff. The first section of sixteen miles was opened for passenger traffic on the 9th October, 1840. In 1841 the weight of goods and minerals carried amounted to 62,651 tons, in 1842 194,469 tons, in 1852 952,119 tons, in 1862 2,922,486 tons, and the weight conveyed in 1906 was 19,076,459 tons.

The following statement of the receipts on this line for the week ending June 22nd, 1844, and for the corresponding week in the present year (1907) furnish a striking comparison :—

1844.	£	s.	d.	1907.	£
Passengers	121	16	5	Passengers...	4,248
Merchandise	139	2	7	Merchandise	1,743
Coal and Minerals ...	519	6	5	Coal and Minerals... ...	13,313
				Dock Dues...	1,941
	£780	5	5		£21,245

These figures do not, however, adequately represent the enormous growth in the tonnage carried, as the rates charged in 1844 were more than double the figures which are being charged to-day.

This Railway was originally a single line, but it has since been doubled throughout, and in some places there are now four main lines. The mileage is 125 miles, and its capital £9,798,885. The Company has had a most prosperous

financial career. Its dividends between 1876 and 1888 averaged 14 per cent., which has not been equalled by any other Railway Company in the Kingdom. They have a lease of the Penarth Harbour Dock and Railway for 999 years.

The Barry Railway and Docks Company was incorporated by Act of Parliament dated 14th August, 1884, and in addition to their Dock property they have 45 miles of Railway, with a capital of £6,006,663. This Company also work the Vale of Glamorgan Railway.

The Rhymney Railway was incorporated by Act of Parliament dated 29th July, 1854. It has a mileage of 39 miles, and the capital is £2,391,457.

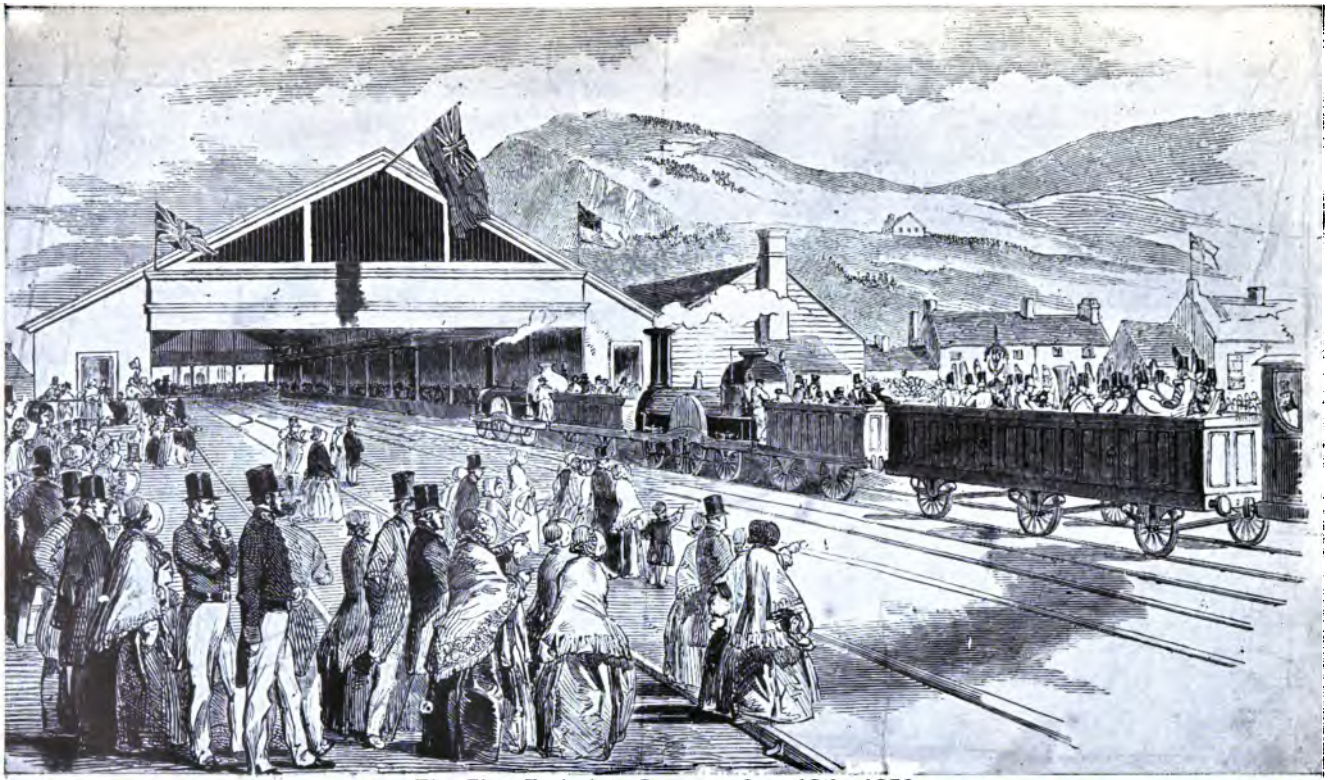
The Port Talbot Railway and Docks Company was incorporated under the Act dated 31st July, 1894, and, in addition to their Dock property, they have 34½ miles of Railway, and their capital is £1,644,587.

The Rhondda and Swansea Bay Railway Company was incorporated by Act of Parliament dated 10th August, 1882. The length of line is 31 miles, and the capital is £1,218,429. This Railway was a somewhat expensive one to construct, inasmuch as it has the longest tunnel in South Wales, and there is also a very fine swing bridge crossing the tidal river Neath.

The Neath and Brecon Railway Company was incorporated by Act of Parliament, dated 29th July, 1862, their mileage is 33 miles, and the capital is £1,339,024.

The South Wales Mineral Railway was opened in April, 1861, under their Act of 1853, and its length of line is 13 miles. On a portion of this Railway there is a very steep gradient, and the traffic over that part has to be worked by means of a rope. In this Session of Parliament (1907), however, a Bill has been passed for making an avoiding line which will do away with this.

The Act for the South Wales Railway received the Royal assent in 1845, the construction of the line was forthwith proceeded with, and it was opened for traffic in 1850. This



The First Train into Swansea June 18th, 1850.

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Railway was amalgamated with the Great Western Railway in 1863, it has Junctions with all the other Railways above-mentioned, and provides a most efficient service with all parts of the United Kingdom.

The population of Glamorganshire in 1801 was 70,879; in 1821, 102,073; in 1841 (when the first Railway had just been opened), 171,188; in 1861, 317,752; in 1901 it was 859,931; and it is still rapidly increasing. The population of Cardiff has increased from 1,018 in 1801 to nearly 200,000 at the present day. At the commencement of the last century, the shipment of coal from Cardiff was only about 1,000 tons per annum, in 1829 it had risen to 84,000 tons, in 1852 the shipments amounted to 801,027 tons, whereas last year (1906) the quantity of coal, coke and patent fuel shipped from the Port of Cardiff, which includes Penarth and Barry, reached the huge total of 22,113,965 tons, which is very greatly in excess of the volume of coal exported from any other port in the Kingdom. It is the general rule to attribute the success of Cardiff to its Docks, but it was not until after the opening of the Taff Vale Railway in 1840 that Cardiff commenced to obtain the supremacy over the neighbouring Ports of Newport, Swansea and Llanelly. Up to this date each of the latter Ports was shipping larger quantities of coal than Cardiff.

The output of coal from the South Wales Coalfield in 1860, which is the first official record, was 10,255,263 tons, and in 1905 it had risen to 33,172,214 tons.

Notwithstanding the great increase in the output during recent years, it would still appear that the prosperity of Glamorgan is a long way from its zenith. Fresh colliery enterprises are continually taking place. Especially is this the case in the Avon Valley and on the Whitworth Estate, where there is a vast area of virgin coal. The excellent results obtained in the use of anthracite coal in making suction gas will undoubtedly give this class of the business a further stimulus. Then, again, the Dock authorities at Cardiff

and Swansea are anticipating a large expansion of trade by providing additional docks, which will be able to accommodate the largest vessels afloat, and will be equipped with the latest and most up-to-date machinery. The new dock at Cardiff was opened on the 13th July, 1907, by His Majesty the King. His Majesty cut the first sod for the new dock at Swansea on the 20th July, 1904, and the constructional work is being carried out by Messrs. Topham, Jones & Railton (who also built the Cardiff dock) with such expedition that it is confidently anticipated that the works will be completed within the next two years, and well within the contract time. When the new dock is ready, Swansea will be able to offer facilities that will be unsurpassed by any port in the Kingdom.

In view of the agitation in certain quarters for the resuscitation of Canals, a close study of the circumstances appertaining to the Glamorganshire Canals goes to show that their revival could not possibly be of any benefit to the community at large. These Canals serve the district, which witnessed the birth of the copper smelting industry in Wales, and where from time to time various other industries have been introduced, some of them having but a short and chequered career, and the others remaining to this day most successful undertakings.

Taken as a whole, the coal, iron and steel, tinplate, and copper trades of this district are at the present time in a most flourishing condition, and yet we find the Canals doing an infinitesimal quantity of business, which nearly a hundred years ago, were paying as well as any in the Country. It would, therefore, appear that there is here suitable ground for enquiry into the causes, which have led to the decay of the Canal traffic, and have yet left the surrounding neighbourhood more prosperous than ever.

The inadequate facilities provided by Canals for dealing with coal traffic was the subject of a paper read in 1862, by a Mr. Ashcroft, before the Members of the South Wales Institute of Engineers. In it he stated that although the Glamorgan

Canal Company had at that time reduced the cost of transit of coal by that means from Aberdare to Cardiff to 2s. 2d. per ton, as against the rate of 2s. 4½d. per ton charged by the Railway Company, preference was given to the latter means of conveyance, owing to superior facilities in other respects. He pointed out that owing to the time occupied in negotiating the fifty locks on the throughout distance, the journey by Canal, under the most favourable circumstances occupied fifteen hours, whereas the Taff Vale goods trains ran from Merthyr to Cardiff in less than three hours. The Railway also was very much better managed, good supervision was exercised, and the men were well disciplined, with the result that they supplied a reliable service. On the Canal there was no such thing as discipline. It was a frequent custom of the men employed with the barges to turn their horses into adjoining fields to graze, whilst they themselves adjourned to the nearest public-house, and there spent a whole day drinking.

At the time of which Mr. Ashcroft was speaking, the Rhondda Valley was just beginning to establish a status as a steam coal producing district, and about seven years had elapsed since the first train of this class of coal had been run down from this Valley to Cardiff, and in one decade the volume of business over the Taff Vale Railway more than trebled itself.

In the early days, when the coal was brought from the collieries by Canal, the coal was wheeled from the barges and stacked on the wharves, and again wheeled from stock, and the contents of the barrows emptied into the vessels, at a cost for each service of 3d. per ton. At this period the stock of coal on the wharves often exceeded 20,000 tons.

When the docks were constructed, tipping facilities were provided which enabled the colliery proprietors to get their coal shipped with better despatch and more economically than by the old methods, and as considerable improvements have since been effected, it is now possible to load as much as 5,000 tons of coal into one vessel within 12 hours.

To-day, owing to the enormous growth of steamship business, coaling stations are provided in various parts of the world, which are mainly supplied with coal from South Wales, with what has come to be known as "Cardiff Coal." For a considerable time it has been the aim of the colliery proprietors, in conjunction with the dock authorities, to ship this coal with the least possible breakage, and with this object in view anti-breakage boxes are provided at the coal tips, and cranes are also used at Cardiff for lowering the coal gently into the bottom of vessels. It is difficult to imagine what could be devised by engineering skill, except at an altogether prohibitive cost, that would enable this to be done satisfactorily from a barge. So important is this question considered that at the present time means are being sought that would still further reduce the breakage which even now occurs, notwithstanding the great care that is taken. Some time ago, Messrs. Cory, Yeo & Company introduced iron boxes or tubs into their barges between Clydach and Swansea, which could be lifted out by cranes, but they were not a success, one of the objections being that the weight of the boxes seriously affected the carrying capacity of the coal barges.

In addition to their shipping business, most of the collieries do a large inland trade, and nearly all of them have screens, by which means they make the various descriptions of large, nuts, through and through, or small coal, which may be required for shipment as cargo, for the bunkering of steamers, or for land sale purposes. In the case of the collieries producing "Anthracite," they make a dozen different sizes of coal, such as large, cobbles, nuts, eggs, beans, peas, small, duff, &c., which, in addition to being sent down by rail for shipment, are also sent away by rail to all parts of the country.

In the case of coal sent from the collieries for manufacturing purposes, the various sections of the works are intersected with Railway sidings, which (to appropriate a term

frequently used in connection with the promotion of Railway Bills), enables them to get their coal down "direct from pit to furnace." Many of the works find it necessary to mix coals from different collieries in the process of their various manufactures, which they can conveniently and economically do when the collieries with which they do business have Railway connections. Under these circumstances the local Canals would not be used to any greater extent than at present, even if the Traders were allowed to make use of them free of all tolls and charges.

One or two other examples of the causes that have led to the decay of Canal business may be mentioned. For instance, at the source of the Neath Canal the surrounding district is very rich in minerals. There are very excellent silica deposits to be found there, and fire-bricks made from this clay have been supplied to all parts of the world. Up to 1878 this district was entirely dependent upon the Canal for means of communication, and the bricks made upon the spot were sent down to Giant's Grave, and from there shipped in small vessels. Owing, however, to the transition in trade, both on sea and on land, during the preceding years, the Abernant Dinas Silica Company found the Canal quite out of date for dealing with their business, which is clearly proved by the expense that they went to in order to find other means of transit for their bricks, and in 1877 they decided to make a connection, at their own expense, with the Vale of Neath section of the Great Western Railway, at a capital cost of about £11,000. The proprietor of the Aberpergwm and Pwllfaron Collieries incurred similar expenditure, in order to form a connection with this Railway at Glyn Neath, and in this instance further expenses were necessary, in Parliamentary powers being required, as the line crossed the Neath Canal, the owners of which opposed the making of the Railway connection. The latter expense would not have been necessary had Railway Companies but possessed the "eight mile Canal clause" previously referred to. These collieries have an

output of 1,200 tons per day; they screen the coal into several sizes (which they could not conveniently do when sent by Canal), and in addition to shipping the coal it is also sold for land sale purposes. The cost of shipping this coal by rail at Swansea is now 1s. 3d. per ton free on board, whereas the cost by Canal was 3s. per ton free on board. Then, again, the Ynisarwed Colliery, which is one of the oldest collieries in the South Wales Coal Field, has during the present year made a siding connection with the Great Western Railway between Aberdylais and Resolven, at a capital cost of about £4,500. They will, however, now be able to ship their coal, free on board Swansea, for 1s. per ton, as against the amount of 2s. 3¼d., which they have hitherto paid. In addition to the saving in the cost of carriage the large coal can now be tipped into vessel with 20 % less small, by sending direct from pit to dock in truck, which means that they will now be able to get at least 1s. per ton more for it.

In the face of these facts, it is not surprising that there is little or no coal now being sent over the Glamorgan Canal, indeed, this Canal is only now being used to a very small extent between Cardiff and Abercynon, the banks and locks on the upper reaches having fallen in. On the Neath Canal, the total quantity of coal passing over its waterway does not now exceed 5,000 tons per annum, there is, however, about 6,000 tons of clay brought down from Abernant to the brick works at Neath, and there is also a small trade in gunpowder, which is sent over this Canal to Aberdylais, from whence it goes over the Tennant Canal, and is shipped at Red Jacket Pill, as this article cannot be dealt with in any dock. Fifty years ago, 200,000 tons of coal per annum were brought down over the Neath Canal and shipped at Giant's Grave, but no coal has been shipped at this place since 1883.

The quantity of coal shipped by means of the Tennant Canal used to average 150,000 tons per annum, and the coal and other traffic conveyed for the works on its banks amounted to a further 120,000 tons, now, there is no coal

whatever passing along its line, and the total business done only amounts to about 10.000 tons per annum, which consists principally of copper from the Cape Copper Works, which is shipped at Swansea.

Both the Neath and Tennant Canals derive a considerable revenue by supplying water to the various works along their line of route, and in the Briton Ferry district, the first-mentioned is rated upon £132 for this, although the Canal itself for the distance of two miles in the same parish is only assessed upon £20 gross, and £15 nett rateable value.

Railway Companies are frequently being attacked for charging the legal Parliamentary fare of a penny per mile for passengers by ordinary trains, and one writer, basing his argument on the grounds that the purchasing power of money has grown enormously during the last sixty years, goes so far as to describe the maintenance of this minimum as a ridiculous extortion. So far as Railway Companies are concerned, this is a fallacy as shewn in previous pages, and it should also be remembered that the comfortable carriages of to-day have only been provided by incurring great expense. In all other commercial businesses, it is pretty safe to say that any alterations or improvements effected for the benefit of customers, have, in the end, to be paid for by them. These same people who are continually calling upon the Railway Companies to march with the times, to provide better facilities in all directions, would, very probably, be the last in the world to bear a share in the expense.

Mr. William Brace, Member of Parliament for South Glamorgan, in giving evidence before the Parliamentary Committee dealing with the proposed new Railways in the Sirhowy Valley, in the present Session, stated that "the selling price of coal was a dominating factor in the regulation of the workmen's wages. Everything saved in carrying to the ports was deducted, and if they had a reduction in the carrying rates, it would naturally increase the selling price of coal in the employers' favour, and to that extent would be a

substantial advantage to the workmen's wages." As already pointed out, the Railway rate in 1862 upon coal from Aberdare to Cardiff was 2s. 4½d. per ton. Reductions have, however, from time to time been made, until to-day the Taff Vale Company's rate has fallen to 1s. 1d. per ton, or a reduction of 1s. 3½d. per ton from the figure quoted by Mr. Ashcroft. As similar reductions have been general throughout the South Wales Coalfield, it will be seen that Railway Companies forty-five years ago were receiving 100% more upon coal traffic, etc. than they are now getting in this district. The reduction of 1s. 3½d. per ton upon the output in 1905, of 33,172,214 tons, shows a saving of £2,125,095 in Railway carriage to the colliery proprietors, and means to the workmen an advance in wages of 11½ per cent.

At this point it may be appropriate to give a few examples of the comparative cost of transit and the means of communication provided for the travelling public about 70 years ago with that of the present day. At the earlier period, the fares for passengers by mail coach from London to Swansea were £10 inside and £5 outside; there were three coaches a week in each direction, and each journey occupied 36 hours. The Great Western Railway Company now run nine trains daily in each direction between these points. Several of these perform the journey in four hours, and breakfast, luncheon, dining, supper, buffet and sleeping cars, all most comfortably equipped, are attached to them, and the tariff is very reasonable. The fares are £1 13s. 0d. first class, 16s. 6½d. third class. This Company run half day excursions from Swansea to London and back at the low fare of 6s., a distance in the double journey of 397 miles, so that the fare charged works out to ·181d. per mile.

In 1827 a stage carriage was run on alternate days between Swansea and Carmarthen, a distance of 32 miles. The time occupied was six hours, and the fare 12s. The proprietor of this carriage called the particular attention of his patrons to the fact that the construction of the vehicle

was such that they would be conveyed rapidly to their destination without any danger to life or limb. Against this, the present day service by rail is 1¼ hours and the fare 2s. 8d.

Steam packets had shortly before this period (1827) been introduced, and were run on alternate days between Bristol and Swansea and Bristol and Tenby, the fares being :—

To Swansea £0 15s. 0d. after cabin ; 7s. 6d. fore cabin.

To Tenby £1 1s. 6d. after cabin ; 14s. 6d. fore cabin.

The time occupied on the journey between Bristol and Tenby was ten hours, and as the steamers were only small, and carried merchandise in addition to passengers, it may be safely assumed that very few persons made the voyage, except for urgent business purposes, unless wind, weather and other circumstances were favourable. A trip of this kind on a dreary winter's day can be better imagined than described, although in all probability the discomfort the passengers were subjected to was not any greater than that of the traveller over the roads, the condition of which has already been referred to.

In the early part of the last century the notices relating to the service between Dover and Calais stated that the sailings would take place during times of peace. Many years have now elapsed since any reservation of this kind has been necessary, and in the meantime great improvements have been made in the facilities for visiting the Continent, due in a very large measure to the action of the various Railway Companies, who have at great expense provided docks and steamers for the business, and by arranging cheap fares have given every encouragement to those who are desirous of availing themselves of a Continental holiday.

Two great improvements have also recently been made in the services between Great Britain and Ireland, due to the enterprise of the Midland Railway Company at Heysham, and to the opening of the new route between Fishguard and Rosslare, by the Great Western Railway Company of England and the Great Southern and Western Company of

Ireland. The latter route was opened for public traffic on the 30th August, 1906, and it has shortened the time occupied between Swansea and the South of Ireland very considerably, as the following particulars show :—

	1905. Via New Milford. Time occupied.	1907. Via Fishguard. Time occupied.
London and Rosslare ...	—	8½ hours
" and Waterford ...	13¼ hours	9¾ "
" and Cork ...	17 "	12½ "
" and Killarney ...	19½ "	13½ "
Swansea and Rosslare ...	—	5¾ "
" and Waterford ...	8¾ "	7½ "
" and Cork ...	12½ "	8¾ "
" and Killarney ...	15 "	9¾ "

The opening of this route has shortened the distance by sea to the South of Ireland from 106 miles to 68 miles; the new turbine steamers perform the passage in 2¾ hours, and the saving in time to inland places like Killarney is about six hours. This alone should do much to popularise this beautiful haunt of tourists, and thereby benefit the surrounding districts.

Both at Fishguard and Rosslare facilities have been provided for expeditiously dealing with passengers, merchandise, and live stock traffic. Electrically worked cranes and capstans have been fixed, and should the enterprise of the Railway Companies attract an extension of business, which it is confidently expected will be the case, the present accommodation could be increased tenfold. That nothing will be wanting in order to attain this end, may be judged from the fact that they are accelerating their goods service by equipping their stock with vacuum brakes, etc., in order that the dairy and perishable produce of Ireland may be delivered in the populous districts of Glamorganshire and other places at the earliest possible moment.

It is to be hoped that the result of the inauguration of this new means of communication will do something to

Fishguard Express.

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restore the prosperity of Ireland, and that the improvement in transit facilities will be successful where politicians have failed.

Surprise has frequently been expressed, especially by after-dinner public speakers, at the fact that the ship-building industry is not established on a large scale in the county of Glamorgan, which is so bounteously supplied by nature with the raw material necessary for successfully carrying on undertakings of this description. It is to be feared, however, that an opportunity for its introduction was allowed to slip by, and the chances are that it will not occur again. The saying, "There is a turn in the tide of the affairs of man, which, if taken at the flood, leads on to fortune," applies with equal force to communities as well as to individuals.

The attitude adopted by the inhabitants of Glamorgan towards the ship-building industry is the one black spot in its history of progress. When this business was in its infancy, we find the following in the *Cambrian* of 23rd December, 1826 :—That "a numerous meeting of the Merchants, Ship-owners, Shipmasters and others was held on the 14th December at Swansea praying for the interference of Parliament to devise and adopt some means to protect sailing vessels against any further increase of steam vessels for the carrying of goods." The opposition from sailing ship-owners can be understood, but why the merchants of the port of Swansea, which Lord Swansea has prophesied is destined to become the ocean port of England, should have joined the former in their objection to steamships is to-day quite incomprehensible.

At this period the Neath Abbey Iron Works, founded by Messrs. Fox and Price, who were generally referred to as the "Quakers," had established a world-wide reputation as makers of all descriptions of engineering work. Many of the first steamships built in the North of England were supplied with their boilers and other machinery from these works, and that they went further afield than England is shown in the fact that in March, 1835, they forwarded from Swansea, in the

ship "Rosalind," 400 tons of mining machinery and 40 mechanics and miners to Tampica and Vera Cruz, South America. They subsequently went in for building steamships themselves, which were of excellent quality, but through lack of capital and public support, they were unable to compete in this direction with the large works on the Clyde and in the North of England. These works were closed about 25 years ago, but their abandonment was certainly not due to any lack of engineering skill, because there is hardly a works of note in the country to-day where there is not to be found a manager or foreman who served his apprenticeship at Neath Abbey.

It certainly appears that this spot would have been an ideal site for the establishment of a large ship-building yard, and that the engineering difficulties would not have been nearly so costly as the canny Scots had to contend with in connection with the trickling Clyde, which has since attained such a proud position. The question of site would not offer any insuperable obstacle to the creation of the ship-building industry in this district to-day, but where the difficulties would arise would be in providing sufficient capital to erect a works on such a scale that they would be able to compete with the existing works in other districts, and also in securing the services of sufficient skilled mechanics in order to successfully carry on such works when erected. In other directions, however, there is plenty of scope for the establishment of additional industries, notwithstanding the great developments that have taken place during the last century. The "Black Mountains," situate near the outcrop of the South Wales coalfield, on the borders of Glamorganshire and Carmarthenshire, contain a striking variety of minerals, which to-day are only being worked in a most primitive fashion, although it is apparent to the most casual observer that by the adoption of modern ideas they could be worked much more economically, so that, assuming any profit is being made in the present rough and ready style of working, it is self-evident that

fortunes could be made if it were carried on upon up-to-date lines. These mountains contain in some parts immense silica deposits, the percentage of pure silica being as high as 98 per cent. in its natural state, whilst close to are excellent beds of limestone and other minerals. Thus it would appear that this is an excellent field in which scientists might test the suitability of the various materials found there for the making of "Portland Cement," for which to-day there is an increasing demand.

Owing to the great success of the majority of the collieries in Glamorganshire, it would appear that the possibilities of the district in other directions have been overlooked, but now that is being substituted for iron and steel for various purposes, "Concrete" and leading possibly to a reduction in the requirements of coal, it would certainly be advisable to look round and see to what uses the contents of our mountains, lying to-day unworked, can be applied. That our Railway Companies would welcome with open arms the establishment of new industries will be seen from the following advertisment issued by the Great Western Railway Company :—

"Sites for works, factories, warehouses, etc.—Adjoining "the Great Western Railway Company's system—the largest "in the United Kingdom—there are in various localities con- "siderable areas of land admirably situated for the erection "of works, factories, warehouses and other industrial under- "takings. The Railway is directly connected with some of "the largest steam, anthracite, and house coal fields in the "kingdom, as well as with important and extensive iron and "steel producing centres, and ironstone fields. Combined "with these advantages, good water supplies, cheap labour, "etc., offer inducements to firms, companies, syndicates, and "others desirous of establishing new industries. The districts "served by the Company's Railway have many hundreds of "miles of seaboard, on which are some of the principal and "largest Ports in the country. These districts are therefore "very convenient for import and export, as well as for inland

"business. The Company are desirous of assisting in the "establishment of works, factories, warehouses and other "industrial undertakings adjoining their system of Railways, "and are prepared to enter into arrangements for siding "connections to be made with the Railway. Information as "to suitable sites, siding facilities, conveyance rates, etc., will be "readily afforded on application to Mr. T. H. Rendell, Chief "Goods Manager, Paddington Station, London."

Although these views of the mineral wealth of the Black Mountains are in no way claimed to be those of an expert, they are, nevetheless, the outcome of the impressions I have received from time to time as a student of transit in its relation to the prosperity of our Country in the development of its resources. In discussing the possibilities of this or any other district, it would be well to remember that the existence of the steam coal measures in the Rhondda Valley, now admittedly the finest in the world, was at one time scoffed at, long after the upper seams were being worked.

TRANSIT OF THE FUTURE.

Notwithstanding all that has been accomplished up to the present time towards solving the problem of safe, speedy, and cheap means of communication in this Country, the question cannot yet be regarded as completely answered, when it is remembered that there is still lying in many of the mountain districts, in its natural state, immense stores of mineral wealth, which would find a ready market if economical transport facilities were provided. The imports of butter, cheese, eggs and bacon from foreign countries in 1905 reached the huge total of £47,513,724, and many experts who have made a special study of the circumstances believe that the bulk of this produce could be raised at home at a pecuniary gain to the farmer, if it were possible to convey it cheaply and quickly to the consumers. The importation of timber for mining purposes is also yearly increasing in volume. The advantages that would accrue to the community at large by a revival of our once flourishing agriculture are apparent, and although much could be done by the farmer himself to work out his own salvation, it may not be out of place to consider what would be the most satisfactory methods of providing transport facilities for opening up Country districts.

From what has already been written on Canals it will be seen that, owing to the transition in trade since their inception, it is very improbable that any extension of these into virgin districts is likely to take place, and where they have been allowed to become obsolete their resuscitation would not open up any new fields of industry. So far as Railways are concerned it may be accepted as a fact that in nearly

every district throughout the length and breadth of the land, where there is any likelihood of a Railway Line paying a reasonable return on the capital cost of construction such localities already possess at least one Company's Line, and improved transit facilities for the accommodation of passengers and merchandise in rural districts must be looked for on less costly lines.

The day of the flying machine is not yet, and the idea that electrical energy will some time in the future be supplied from Niagara to this side of the Atlantic, by some such means as wireless telegraphy, or through cables, is at the moment nothing better than a dream. Although the lessons of the past teach us that it would be most unwise to treat suggestions of this kind with derision, we can very well postpone any discussion upon proposals of this nature until they have advanced to such a stage that they are capable of being tested by actual experiment.

Turning to the consideration of schemes that have been proved to be satisfactory in many cases, it certainly appears that aerial or elevated Railways, which are in use in foreign countries to a much greater extent than in this country, could with advantage be introduced in many hilly districts. Although the capital outlay would probably be more costly, the working cost and upkeep is much less than the expense of tramways.

The Act authorising the construction of light railways was passed in 1896, and in the same year motor cars received their Magna Charta, and if these two means of transport are utilised to the utmost of their capacity by the inhabitants of outlying districts not connected with any Railway system, they will undoubtedly be of great assistance in advancing the national prosperity.

We were in this country at least ten years behind France in the introduction of modern motor cars, and it was not until 1895, when the capabilities of these cars were tested in that country, that this means of road locomotion was revived in

The First Motor Car to Tour Wales, June, 1898.

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Road Motor Omnibus.

England at the point where it was left by Gurney and others some sixty years earlier, and although only one decade has passed away since then, the improvements that have been made in their construction and capabilities are really astonishing, and without a parallel in the history of mechanical inventions.

In considering the respective merits of light railways *versus* motor cars, the latter has one great advantage, and that is that they can be introduced into any district, and if, after a trial, they are found unremunerative, they can be forthwith transferred to another sphere of operations, and any loss would be infinitesimal as compared with the expenses incurred in the construction and equipment of a light railway, and even in the matter of the actual working cost the latter is at a disadvantage.

The suitability of motor cars for the conveyance of passengers is now well established, but so far as merchandise is concerned they have not yet come into general use in many districts that are quite ripe for their introduction, but as the advantages that would be gained thereby become known, there will undoubtedly be equally as great developments very shortly in this direction as the last few years have witnessed in the popularity and growth of the passenger business.

There are several types of motor vehicles adapted for the haulage of merchandise. Some of them are self-contained vehicles, with an engine underneath, and in others there is a small traction engine, drawing a wagon or wagons behind it. We have also recently (April, 1907) had on exhibition in this country the Renard Automobile train, which was originally designed by the late Colonel Renard for the French War Minister. One of these trains was successfully employed by the 20th Army Corps at Nancy in 1906 in carrying provisions, ammunition, ambulance, etc. The train usually consists of a 50/60 h.p. motor, two open cars for passengers, one open truck, and a van. The trials which took place in this country were satisfactory, the engine drawing the other vehicles

in an exact line, around corners and on the straight, in the track of the wheels of the leading motor vehicle, and it is claimed that the train is suitable for road transport of goods, passengers, minerals, and market produce.

In considering the effect of these new means of overland transit, which have so recently sprung into existence, it will be apparent that Railway Companies have suffered considerable depletion in their revenue by their introduction. Especially is this the case so far as electric tram cars are concerned, but it is confidently anticipated that road motor cars will ultimately be considerable feeders for their passenger and merchandise business, by the opening up of districts hitherto practically untouched from a trading and commercial point of view. When this much desired object has been attained it is to be hoped that the fallacy of Railway Companies being the natural enemies of the traders will disappear for ever in the dark mists of oblivion.

Electric Parcels Delivery Van.

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APPENDIX.

Extract of letter from the Merthyr Tydfil Correspondent to the *Cambrian*, dated 22nd February, 1804 :—

"TREVETHICK'S LOCOMOTIVE.

Yesterday the long expected trial of Mr. Trevethick's new-invented steam engine for which he has obtained His Majesty's letter patent, to draw and work carriages of all descriptions on various kinds of roads, as well as for a number of other purposes to which its power may be usefully applied, took place near this town, and was found to perform to admiration all that was expected from it by its warmest advocates. In the present instance, the novel application of steam by means of this truly valuable machine was made use of to convey along the tramroad ten tons (long weight) of bar iron from Penydarren iron works to the place where it joins the Glamorganshire Canal, upwards of nine miles distance, and it is necessary to observe that the weight of the load was soon increased from ten to fifteen tons by about seventy persons riding on the trams, who drawn thither (as well as many hundreds of others) by invincible curiosity were eager to ride at the expense of this first display of the patentee's abilities in this Country.

To those who are not acquainted with the exact principle of this new engine, it may not be improper to observe that it differs from all others yet brought before the public by disclaiming the use of condensing water, and discharges its steam into the open air or applies it to the heating of fluids, as convenience may require. The expense of making engines on this principle does not exceed one half of any on the most improved plan made use of before this appeared. It takes much less coal to work it, and it is only necessary to supply a small quantity of water for the purpose of creating the steam, which is a most essential matter. It performed the journey without feeding the boiler or using any water, and travelled with ease at the rate of five miles an hour. It is not doubted but that the number of horses in the kingdom will be very considerably reduced, and the machine in the hands of the present proprietors will be made use of in a thousand instances never yet thought of for an engine.

We have great pleasure in adding that this valuable improvement has attained its present perfection in consequence of the spirited and active patronage of Mr. Homfray, of Merthyr Tydfil, Glamorganshire."

Extract from the *Cambrian*, October 17th, 1840.

OPENING OF THE TAFF VALE RAILWAY.

The public opening of the completed portion of this interesting and valuable line between Cardiff and Navigation House took place on Thursday se-night, and was celebrated by the inhabitants of Cardiff, Newbridge, and other places in its neighbourhood in a manner which showed that they were fully alive to the local and commercial importance of the undertaking.

It had been arranged by the Directors, in order to avoid confusion and to prevent interference with the ordinary traffic, as well as to afford the shareholders an opportunity of deliberately inspecting their line, that the special train should leave Cardiff at 12 o'clock, and accordingly, long before that hour, the immediate neighbourhood of the station, and, indeed, every point from which a view of the proceedings could be obtained, was densely crowded with spectators.

Never did Cardiff present a more gay and animated appearance. All classes of the inhabitants seemed to vie with each other in demonstrations of joy and satisfaction. The bells rang merry peals, flags streamed from the castle steeples, and the houses of such of the inhabitants as were located in the neighbourhood of the station. Cannon were fired continuously throughout the day, and the very excellent band of the Glamorganshire Militia, which was stationed at the terminus, contributed to the holiday by performing a variety of marches, quadrilles, &c.

At a few minutes before 12 o'clock eight carriages were appended to "The Taff" locomotive engine, and shortly afterwards the company, to the number of 180, took their seats. All the rank, fashion and beauty of the neighbourhood were there.

The shrill tones of the steam whistle soon gave notice to the spectators that the carriages were about to start, and in a minute afterwards the whole train moved forward slowly and majestically for some yards, greeted by loud cheers, salutes of artillery, and accompanied by the lively peals from St. John's belfry, which latter commenced in the morning with the rising sun, and continued at intervals till night.

Shortly after the start some portion of the distance was performed at the rate of forty miles per hour. The speed was then necessarily decreased, so as to cause the arrival of the train at Newbridge, a distance of 12 miles, precisely in 31 minutes. At Newbridge a small portion of the passengers alighted, but by far the greatest part proceeded as far as the extremity of the railway, near the Navigation House, where the numerous band of F. Crawshay, Esq., was drawn up, and received the approaching train with "God save the Queen" and "Rule Britannia." Descending from the carriages, the passengers, preceded by Sir John Guest, entered a temporary wooden house erected by the proprietors, who very spiritedly supplied the party with champagne and other wines and viands in abundance.

After the lapse of a few minutes, it was announced by an individual who ascended the table, that all persons who wished to proceed to the tunnel at "Cefn Glas," would be allowed half-an-hour to walk there; consequently a large party set forth, preceded by Sir John Guest, Lady Charlotte and the Crawshay band.

Upon their arrival at the tunnel, everybody was amazed at the glittering novelty, for it had been most tastefully illuminated to the whole extent, upwards of 300 yards. After remaining there and being highly gratified for some time, and enjoying an advantageous view of the six arched bridge beyond, the party returned, and as soon as all were seated in the carriages, they advanced slowly to Newbridge, whence they arrived at Cardiff in 28 minutes, the weather having been most propitious during the whole day.

In the evening, the directors, share-holders and friends of the undertaking sat down to a public dinner in the ball-room of the Cardiff Arms Hotel. About 100 gentlemen attended, and the chair was taken by Sir John Guest, Bart., supported on his right by Walter Coffin, Esq., and on his left by Thomas Powell, Esq. and E. J. Hutchings, Esq., M.P.

After the cloth had been removed, and grace said by the Rev. Windsor Richards, the usual loyal and patriotic toasts were disposed of.

The Chairman then rose to propose the health of the Lord Lieutenant of the County, the Marquis of Bute, and in so doing, said he hoped the company would allow him to express his earnest wishes for the ultimate success of the great undertaking his Lordship had commenced in their town. Those mighty works were not only a honour to the projector, but would, conjointly with the railroad, the opening of which they had that day met to celebrate, tend greatly to promote the prosperity of the town and neighbourhood of Cardiff.

The health of the Members for the County having been drunk,

W. Coffin, Esq., said the toast which naturally followed that which they had just drunk was one which they could not expect their worthy and honoured chairman to give. He need not, he was sure, tell them that the inhabitants of that town could never forget the connection of Merthyr with the gentleman who represented it in Parliament. No one could go to Merthyr without seeing that that town was deeply indebted to their honoured chairman. Those great and important undertakings which had been commenced by his enterprise, fostered by his fortune and matured by his judgement and support, were the monument of his attachment to Merthyr, as they were the sources of her commercial prosperity. Connected as he was with Sir John Guest, it would be unbecoming in him to say more, and he would therefore give them with all honours they thought the toast deserved, "Their Chairman, the Member for Merthyr."

The toast having been drunk with long-continued applause,

Sir John Guest rose to return thanks. His friend, Mr. Coffin, had alluded in kind and flattering turns to his connection with Merthyr, with reference to which he could only hope that, when he should be gathered to his fathers, it would never be said that her interests had languished in his hands. Before he sat down he would ask them to drink success to the great undertaking which had led to their meeting, and in doing so he could not refrain from congratulating the shareholders on the cheering prospects of success which had presented themselves. They were not desirous of running a race of rivalry with any undertaking; their object was to develop and increase the commercial resources of their country. There would be, he hoped, trade enough for all—trade for their railroad, for the old Canal Company, and for the Bute Docks, and all would exert a combined influence to benefit the town and neighbourhood of Cardiff. The Chairman then gave "Prosperity to the Taff Vale Railway," which was drunk with three times three repeated.

Mr. Woodman, of Bristol, after a short preface, proposed the "Board of Directors."

Sir John Guest, as Chairman of the Board, returned thanks. In looking at the prospects of return for their capital, the first which suggested itself was—coal; and having on his right and on his left two gentlemen who were proprietors of extensive collieries, he would give them the healths of Mr. Coffin and Mr. Powell, and coupled with them "Prosperity to the Coal Trade."

Mr. Coffin, in returning thanks, expressed his confidence in the ultimate success of the line. Before he sat down he would ask them to drink "Prosperity to the City of Bristol," to whose citizens they, as proprietors of the Taff Vale Railway were largely indebted. The toast was drunk amidst loud applause.

Mr. Rudhall, of Bristol, returned thanks for the honour which had been done his fellow-citizens and himself, and alluded in very appropriate terms to her present enterprising spirit. She might be said to be the originator of the Great Western Railway, as also of the great Atlantic speculation, which had completely triumphed. She had laughed at the wise men of Goschen, and one whose name had lately made a noise in the world, Dionysius Landner, was not only foiled in arguments by one of her citizens, Mr. Guppy, but was beaten in the result, which had brought Bristol within a few days of New York. In lending their aid to the Taff Vale Railway, they had done so, not as jobbers, but as commercial capitalists, confident of a fair interest for their money. Indeed, so satisfied was he of ultimate prosperity, that were he so fortunate as to be a married man, he could hope to leave his children no better legacy than this line would offer when its resources were fully developed. Mr. Rudhall then proposed the health of "The Ladies," and resumed his seat amidst loud cheers.

Several other toasts were given and acknowledged, and the Chairman left the chair at half-past nine o'clock. Many of the company, however, remained until a late hour.

Extract from the *Cambrian* 21st June, 1850.

"GRAND OPENING OF THE SOUTH WALES RAILWAY.

IMPOSING DEMONSTRATION AT SWANSEA IN HONOUR OF THE EVENT.

"Tuesday was the 18th of June—Waterloo Day—one of no ordinary interest to all true friends of peace and social liberty, it being the anniversary of one of the most memorable victories recorded in the annals of our country. Tuesday last, too, was a great day for Wales—a day that will be henceforth and for ever warmly cherished by all true Welshmen, it being that on which was ushered in one of the most glorious eras that ever dawned upon the Principality of Wales—an era of locomotion, of cheap transit, of expansive trade, and if we mistake not, of unparalleled commercial and social develop-

ment. From the memorable days when the Roman Generals bade a final adieu to our "sea-girt isle," after having bitterly experienced the valour and prowess of our invincible ancestors, down to the time of the monarchs of the Norman race—from that period to the time when the first Edward crossed the lofty mountains of Wales, and received the submission of the Welsh people—and from that memorable day to the present time, what a concatenation of great events—events the most stirring, pregnant and eventful, has transpired to render famous the history of ancient Gwalia. But great and distinguished as the Principality is, and has been for its many passed epochs, the one which was so admirably and so auspiciously inaugurated at Swansea on Tuesday, in our opinion, has no parallel in the long list of remarkable events which constitute either its history or traditional fame. Whether looked upon as to its future results in a political, commercial, or social point of view, our Welsh annals supply no event comparable, in point of importance, to the advent of the South Wales Railway.

What, then, may we expect in Wales, with its boundless but undeveloped mineral resources, its projected branch railways, its fine harbours and progressing towns, now that—

> "Thy powers, gigantic steam, afar
> Push the slow bark, or drive the reluctant car."

Up to the present time our conveyance has been principally effected by a slow process, involving delays, transshipment, loss of interest, and injury. That system has exploded, it is a matter of history, and it may be now justly said—

> "Our olden times are past and gone,
> Our olden fancies banished."

and henceforth the railway will substitute certainty for uncertainty.

Impressed then with these views, we hail the opening of the South Wales Railway with the strongest feelings of delight and satisfaction, sincerely believing that nothing can contribute more to the increase in the value of property in Swansea, and the Principality at large, and to the advancement of civilization, than the career of improvement in the channel of communication so auspiciously entered upon on Tuesday last by the opening of this magnificent undertaking.

Chepstow being the starting point, the inhabitants were early on the *qui vive*, and notwithstanding the time for leaving was fixed at half-past eight, the town was all in motion long before that hour, and hundreds were to be seen hastening to witness the spot where the new era was to plant its first steps. Just before the start Captain King, one of the magistrates of the

town, at the head of a procession of gentlemen, repaired to the station, and presented an address, which, from its being the first presented on the line, could not but be highly flattering to the South Wales Directors.

Mr. Talbot having replied, the Directors took their seats, and, amidst the loudest demonstrations, off went the train, accompanied by about forty of the men of Chepstow, etc., who were bound for the breakfast at Swansea.

At Newport the arrival of the train was hailed by a vast concourse of people, and a most animated scene it was. Numerous arches crossed the line; flags waved from every elevation; the church bells rang their merriest peals; cannon boomed; and the thouands assembled shouted their welcome, till the welkin rang again.

An address of welcome was presented by the Town Clerk of Newport, signed by Mr. T. B. Batchelor, Mayor, on behalf of the Corporation, and Mr. Talbot having replied, and the Newport Corporation, with a large number of gentlemen (a great number being desirous of going, but were unable to procure tickets) having taken their seats, the lengthened train proceeded, and in a few moments was dashing gaily onward through the verdant and lovely scenery with which this country abounds.

At Cardiff the Directors were greeted by the authorities and the inhabitants in large numbers with great enthusiasm. The entrance of the train was greeted with loud cheers, and everything betokened the interest felt by all classes in the auspicious event of the day. A congratulatory address was presented by the Mayor of Cardiff (Charles Vachell, Esq.), and Mr. Talbot briefly acknowledged the compliment. A large party then entered the train at Cardiff to proceed to Swansea.

At Bridgend the opening of this important line of railway was celebrated with great spirit. The shops were closed and every kind of business suspended for the day. The Chairman and Directors inspected the station, upon entering which, they were presented with an address by the Rev. Robert Knight.

At Neath the reception of the train was as enthusiastic as at other places. Every place was besieged with people, and a large addition was here made to the party proceeding to Swansea.

Sankey Gardner, Esq., the Mayor, on behalf of the Council, presented an address, and Mr. Talbot having replied, the monster-train then proceeded towards its last stage amidst the most deafening cheers.

From Neath to Swansea the sight was truly magnificent and soul stirring. Nothing was heard but the booming of cannon and the joyous exclamations of thousands of spectators who had congregated in every available spot that commanded a view of the railway. At Landore the appearance of the Directors' train, which had by this time its numbers swollen into hundreds of persons, was greeted with a right royal salute, and we may truly say that on no part of the line were the cheers heartier than were those that proceeded from the sons of toil who lined the road from Landore to Swansea. At the Hafod Works the place was decked out with gay colours, and the firing of cannon, was the order of the day.

The arrival at Swansea took place a little after one o'clock, the engines having made the trip from Cardiff to Swansea, including stoppages, in the space of two hours and a half. A more beautiful and soul-stirring scene was never witnessed in Wales than that which presented itself on the approach of the Directors' train into the Swansea terminus, The engines which were guided by Mr. Gooch and Mr. Marlty, were studded with banners, and came in, in splendid style, whilst the inspiriting strains of the military band fell most gratefully on the ear.

As to Swansea, nothing could exceed the gay appearance of the town from "morn to dewy eve," on that memorable occasion. The influx of strangers from the neighbouring towns was unprecedentedly large, and at eleven o'clock there could not be less than 20,000 people about the streets. In addition to the vehicles that arrived from various parts of the Principality, upwards of 500 persons came by water in the "Talbot" steamer from Port Talbot and the neighbourhood, and by the "Pearl" steamer from Milford, Tenby, and other places.

On the arrival of the train, the Directors were met by the Mayors of Swansea, Carmarthen and Haverfordwest. After the ceremony of introduction was over, Valentine Davies, Esq., the Chief Magistrate of Carmarthen, presented a congratulatory address on behalf of the Corporation of Carmarthen.

Mr. Talbot said that he received the address with feelings of great gratification, and he assured the worthy Mayor that, although the South Wales Directors had not now the means at their command to extend the line to Carmarthen, yet they hoped next year they would be able to bring it to that town.

The procession then re-formed, and accompanied by the Directors and visitors, returned to the Assembly Rooms, headed by the fine band of the 77th Regiment. The appearance of the neighbourhood of Cambrian Place was gay beyond

description, and commanded the admiration of all who witnessed it. Every balcony was filled with ladies; the Burrows Square was also gaily decorated, whilst all around were to be seen

> "A thousand banners in the air,
> With Orient colours waving."

The Public Breakfast.

The breakfast took place a little after two o'clock, in a spacious tent erected by Mr. Edgington, of London. The arrangements, considering the number at the banquet amounted to 700, were unexceptional.

Our worthy Mayor, Christopher James, Esq., occupied the chair. He was supported on his right by C. R. M. Talbot, Esq., M.P., Lord Lieutenant of the County, and Chairman of the South Wales Company, J. H. Vivian, Esq., M.P., Lord James Stuart, M.P., Sir John Guest, Bart., M.P., F. P. Barlow, Esq., and C. A. Saunders, Esq., Secretary of the Great Western Railway Company. On his left by Viscount Villiers, Chairman of the Vale of Neath Railway, J. K. Brunel, Esq., Mr. Robert Price, M.P., D. Lewis, Esq., of Ystrad, R. Fothergill, Esq., High Sheriff of Glamorgan, &c.

After the usual loyal and patriotic toasts had been given and responded to,

The Mayor gave the principal toast of the evening, "The Chairman and Directors of the South Wales Railway, and may prosperity attend the grand undertaking which we are this day assembled to commemorate." The toast was received with the most enthusiastic applause.

C. R. M. Talbot, Esq., M.P., on rising to return thanks, was most enthusiastically received. When silence was obtained, he said: Mr. Mayor, My Lords, Ladies and Gentlemen, I must claim your indulgence if I attempt to reply to the toast, which has just been so ably given from the chair, for I assure you, that I am at present labouring under a considerable obfuscation of intellect. I have this day witnessed so many scenes, and undergone so many vicissitudes that I have never experienced before, and have been so magically propelled through mountains and valleys, over and under houses, bridges, rivers and canals, that the whole of these scenes at Chepstow, Newport, Cardiff, down to Swansea, are so jumbled together in my mind that I am afraid it will be a task of no ordinary magnitude to collect my scattered ideas, in order to return thanks for the honour which has been conferred on myself and brother-directors. This day we have completed the first stage of a most magnificent enterprise, and an enterprise which has called into play all the patience,

all the perseverance, yes, and all the money, which could under any circumstances be commanded. When the late Mr. O'Connell addressed some of his monster meetings, he commenced by saying, "This is a great day for Ireland." If you will allow me, I will paraphrase that observation and say, "This is a great day for Wales." I trust you are of an opinion that we have done justice to Wales. And now I will say a word for the shareholders, whose money is invested in the construction of this line. If you will permit me, then my advice is, travel, travel, travel. As Her Majesty calls on her faithful commoners to provide the supplies, so the Directors call upon the public to travel.

As I am in Swansea I may be permitted to make some allusion to its local interests—to the Docks. Ever since I remember Swansea, I have heard a great deal of talk about the Docks, yet it appears that very little has hitherto been done. I remember my old schoolmaster, when the boys were rather idly disposed, used to shout "*hoc age*." Now to the inhabitants of Swansea I beg leave to say "Dock age." On this very field, where the Mayor has done his very best to set us afloat with abundance of champagne, there ought to be 24 feet of salt water. Now, if these Docks are not carried out in a few years I for one will be very much dissatisfied. The honourable gentleman concluded by proposing the "health of the Mayor of Swansea, a man who had done his duty through life, and had done it well."

The Mayor briefly acknowledged the compliment, and, after several other toasts had been proposed and responded to, the *dejeuner* was brought to a close at six o'clock.

The following extracts from a sketch of the life of Mr. Walter Coffin, was written at the time of that gentleman's death, in 1867 :—

"The traveller who now passes along the branch of the Taff Vale Railway, which runs up to the Rhondda Valley, sees colliery chimneys studding it on every side, and there is not a farm, for miles round, which is not under a mining lease. When Mr. Coffin began sinking his first shaft the measures of coal, he was about to search for, had never been proved, having only been worked for local purposes by levels where they cropped out. The only roads that existed were in a miserable state. Skilled labour was, of course, not to be obtained; the few mechanical appliances in the shape of machinery then known were strange to the district. With all the energy and determination which were so conspicuous in

his character, throughout his long and busy life, Mr. Coffin set to work in the face of all these difficulties to carry out his purpose. Of a sanguine temperament, blended with a fine physical constitution, and backed by the substance of his father, he met and overcame, one by one, all the obstacles, physical and financial, which stood in his way. After many delays and disappointments, and at a great expense, he reached the No. 2 and No. 3 veins of coal, which subsequently became so well known as "Coffin's Coal." When he had got his colliery into working order he made, mainly at his own expense, a tramway for carrying the produce to the Glamorgan Canal, which had been originated for the purpose of transporting iron from Merthyr to Cardiff by Richard Crawshay, the founder of the Crawshay family, and had been completed in 1795.

The next difficulty which presented itself was to create a market for his coal. With indefatigable perseverance, he devoted himself to the business of introducing Welsh coal, hitherto almost unknown, to the notice of the consumer. The expeditions he made to all parts of the kingdom, the experiments he tried, to prove its value as fuel, the efforts he made to open outlets for its sale, formed a most interesting part of the story of his life, which he liked to tell and told so well, for he invented from his mother the rare art of telling a story with admirable skill and humour. At last, though only gradually, and with the lapse of many anxious and laborious years, the South Wales coal, especially "Coffin's Coal," began to be sought after, and grew into demand. As the coal trade developed and the iron manufacture at Merthyr increased, the latter began almost to engross the accommodation afforded by the Glamorgan Canal. In this case, as in the case of the Liverpool and Manchester Canal, it was of very little use to complain of the frequent delays to the local traffic. They were too well supplied with business, and, when pressed, were inclined to be very dictatorial. Mr. Coffin was the last person to submit to this. With his usual sagacity he had recognised the value of railways as a means of transport for heavy traffic, at a time when they were generally thought to be a delusion. In 1830 the Liverpool and Manchester Railway was opened, and very soon afterwards he put forward a proposal for a railway from Merthyr to Cardiff. On every hand he was met by active or passive resistance. The Canal proprietory, of course, pooh-poohed the scheme, and his fellow colliery workers were most of them sceptical or faint-hearted. But with untiring perseverance he went on until, having gained the support of some influential men, who had confidence in him, he was able to bring in a Bill. After a

long period of anxiety (for the Bill was opposed in Committee), it was passed in June, 1836, and the Taff Vale Railway Company was formed, with the late Sir John Guest as its Chairman, and Mr. Coffin as one of its Directors. With the greatest difficulty its capital was subscribed, mainly through the personal influence and persuasion of these two gentlemen, and the works were at last completed. But for several years after the line was opened in 1840, it paid no dividend, and there was dismay and discontent among the shareholders. One unlucky plasterer, who, acting on Mr. Coffin's advice, had invested part of his savings in its shares, seriously threatened to shoot him. He lived, however, to be the recipient of nine per cent. dividend, and to express the greatest contrition for his want of faith.

The confidence of Mr. Coffin in the undertaking never wavered. He knew, and he told the shareholders, that there lay on either side of their line inexhaustible sources of traffic, which, with a little patience and management would, before long, make it the most prosperous in the kingdom, and Cardiff, which he had remembered almost a village, a large and flourishing town. In a comparatively few years these predictions were verified. He succeeded to the Chairmanship, gradually the dividend rose from nothing to four, and from four to seven per cent., under his prudent care and conscientious supervision. Fresh collieries were sunk, new iron works started, the whole district was opened up, branches were extended into the smaller valleys. With a capital of more than a million and a half the Taff Vale Railway now (1867) pay a dividend of more than ten per cent., and Cardiff has a population of 40,000. But it was not till 1841 that the tide of prosperity set in upon the undertaking, and Mr. Coffin reaped some, though a very inadequate reward for his enterprise and public spirit. "I dragged a dead horse by the tail for forty years," was his pithy description of his business career. In 1852 he retired from business altogether, and in July of that year was elected Member of Parliament for Cardiff.

The copy of letter, referred to on Page 20, addressed to the *Cambrian* :—

"MR. EDITOR,

Every day is pregnant with wonders, the offspring of the human intellect operating on the mechanical powers. Human labour is already almost superseded by the substitution of

mechanism, and the day is probably not far distant when every man may sit under the shade of his gasometer and steam engine, in the enjoyment of the *otium cum dignitate*, and there shall be nothing to make him afraid, not even the bursting of his own boiler. Probably nothing has contributed more essentially to accelerate the march of intellect than the universal institution of schools for diffusing scientific education among the operative classes, and the latent springs of genius thus called forth like the finites of the great deep broken open, promise speedily to deluge the earth once more, not with water, but with steam.

I was led to these reflections by having lately submitted to my opinon the prospectus of a discovery adapting the gigantic and almost illimitable power of steam to a purpose hitherto deemed without the sphere of mechanics, but which promises to confer more essential benefits on the human family, and to operate a more signal change in the moral constitution of society than all the labours of Watts and Perkins, herculean, as they have been have yet effected in the physical world.

A humble but pious individual, and a member of a mechanical institution, having been long impressed with the evil tendency of those divisions and dissensions, which so often distract the community, and reflecting that they not unfrequently originate in the unsparing criticism with which the doctrine and character of their pastors are usually assailed, by their intemperate and misjudging flocks ; in short, grieved at the numerous evils and inconveniences which flow from the present defective system of pulpit instruction has of late given his serious and unremitting attention to the subject, and at length he hopes he has discovered a remedy in every respect suited to the case.

Like his predecessors in the path of discovery, the great fathers of invention, whose names adorn the page of history, and whose labours have ameliorated and civilised the species, he is prepared to encounter opposition and derision, but, confident that posterity will appreciate his merits and honour his memory, he is resolved that, as he shall then be deaf to their applause, he will now disregard their ridicule.

The invention is nothing less than the application of steam to the purposes of pulpit oratory ; in short, steam preaching.

In the first place, he proceeds on the principle that as all dissensions must be granted to originate in the different views which different minds take of the same subject, and as there are probably not two minds capable of viewing the same question in all its bearings with the same results, it follows that all the controversy in the world, could never effect

unanimity. And moreover, most men, he argues, frequent churches and chapels more in compliance with one of the established practices of society, or to turn their piety to some substantial gain, than to be influenced by the lessons of the preacher, he intends that the machine shall utter merely a sound resembling the monotony and inanity of oral preaching, and by the simple action of a crank it may at any time, to suit occasions, be converted at the will of the engineer to the various tones of declamation or snuffling peculiar to the numerous sects, from the Roman Catholic, down to the ranting preacher. He hopes by this to avoid the imputations of heresy, blasphemy, bigotry, sectarian hostility, theatrical gesture, grandiloquence, and the thousand faults of pulpit oratory, and at the same time to conciliate the zealous of all parties, while the cause of piety can never suffer through the misconduct or immoral and indecorous character of the engine, a point which too often affords just grounds of complaint in the present system.

Then, as to its safety, he intends that the boiler shall be constructed on the principle attached to Mr. Gurney's steam carriage. Should an explosion take place, no bad consequences can possibly occur to the congregation; besides, the engineer would always be at hand to curb its rhapsodies by letting off the steam.

And next, as to its economy. He calculates that a sermon of two hours duration will consume about three cwt. of coal, calculating the force of the engine to be two horse power, which is about equal to that of the most popular preacher, and multiplying this by 104, the number of sermons delivered annually, is £15 12s., and allowing £10 for the tear and wear of the preacher, makes the whole expenditure necessary for his support only £25 12s., a sum bearing no proportion to the salary usually awarded to human services. Besides, the inventor proposes that it shall be furnished with pipes conveying hot water from the condenser, which traversing the pews will thus warm the feet as well as the hearts of the pious.

The engine will also be fitted with a large tube, which will at certain intervals emit a groan, and thus save many asthmatic and consumptive invalids from the cough which such exercises not unfrequently produce. Yet that more zealous individuals may still be enabled to let their light shine before men, or in other words, that they may not be deprived of that edifying mode of displaying their piety, it is provided that branch tubes shall ramify from the main trumpet to any pew that may be desired to have such an appendage, by